Vol. 1107 Number 3

OFFICIAL GAZETTE

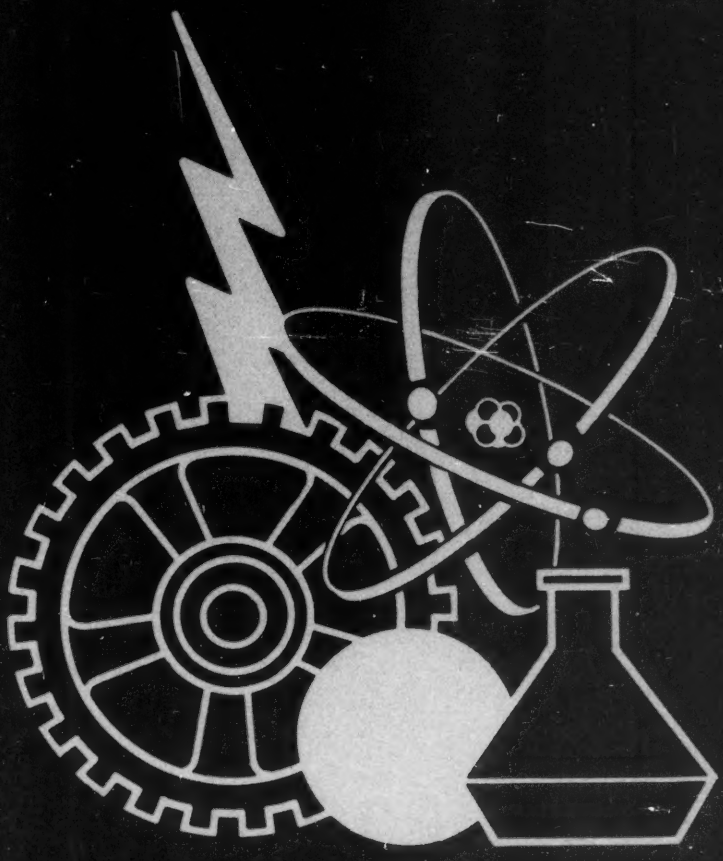
of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

October 17, 1989



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OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

October 17, 1989 Volume 1107 Number 3

CONTENTS

	Page
Patent and Trademark Office Notices	
Patent Cooperation Treaty (PCT) Information	1107 OG 58
Notice of Maintenance Fees Payable	1107 OG 58
Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees	1107 OG 59
Reissue Applications Filed	1107 OG 61
Requests for Reexaminations Filed	1107 OG 61
Service by Publication	1107 OG 62
Registration to Practice	1107 OG 62
Patent Certificates of Correction	1107 OG 63
Special Boxes for Mail	1107 OG 64
Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries	1107 OG 65
Condition of Patent Applications	1107 OG 67
Reexaminations	1071
Reissue Patents Granted (33,090)	1073
Plant Patents Granted (7,047)	1077
Patents Granted	
General and Mechanical (4,873,725)	1079
Chemical (4,874,390)	1311
Electrical (4,874,903)	1455
Design Patents Granted (303,995)	1571
Index of Patentees	PI 1
Indices of Reissue, Reexamination and Design Plant Patentees	PI 74
Classification of	
Patents (Including Reissues and Reexaminations)	PI 69
Designs, and Plants Applications	PI 72
Geographical Index of Residence of Inventors	
Patents (Including Reissues and Reexaminations)	PI 73
Designs and Plant Applications	PI 74
Change of Address Form and Subscription Order Form	Back Page

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.
THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
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PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1107 O.G. 5 on Oct. 3, 1989.

For use of the European Patent Office as a Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 5 on Sept. 28, 1982.

For use of the European Patent Office as an international Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of Sept. 1, 1989, and was announced in the *Official Gazette* at 1105 O.G. 36 on Aug. 15, 1989.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority (ISA)	
—No corresponding prior U.S. national application filed:	550.00
—Corresponding prior U.S. national application filed:	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as Searching Authority	1040.00
Preliminary examination fee	
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as Searching Authority.	400.00
—Additional examination fee, per additional invention	130.00
—Searching Authority not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee:	436.00
Basic Supplemental fee (for each page over 30):	9.00
Designation fee per country or region for the first 10 national or regional offices:	106.00
Designation fee for 11th and subsequent designations:	No Charge
Handling fee:	134.00

U.S. National Stage fees

	Small Entity	Non-small Entity
U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA)	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	30.00	30.00

September 12, 1989. DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on October 14, 1986, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,616,365 through 4,617,683
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on October 12, 1982 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,353,133 through 4,354,278
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

" (e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or

after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00"

"(f) For maintaining an original or reissue patent, except a design or plant patent, basecd on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plani patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$245.00
By other than a small entity.....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug.

27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$495.00
By other than a small enttity.....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED JULY 30, 1989
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,531,245	06/587,205	07/30/85
4,531,246	06/564,558	07/30/85
4,531,251	06/512,374	07/30/85
4,531,256	06/603,928	07/30/85
4,531,269	06/593,460	07/30/85
4,531,274	06/561,420	07/30/85
4,531,275	06/460,295	07/30/85
4,531,281	06/486,047	07/30/85
4,531,296	06/463,888	07/30/85
4,531,298	06/497,425	07/30/85
4,531,302	06/603,124	07/30/85
4,531,309	06/416,920	07/30/85
4,531,310	06/569,756	07/30/85
4,531,311	06/507,244	07/30/85
4,531,315	06/646,304	07/30/85
4,531,316	06/331,965	07/30/85
4,531,321	06/457,492	07/30/85
4,531,322	06/499,493	07/30/85
4,531,323	06/497,155	07/30/85
4,531,327	06/488,239	07/30/85
4,531,328	06/655,238	07/30/85
4,531,330	06/344,748	07/30/85
4,531,335	06/447,961	07/30/85
4,531,346	06/428,178	07/30/85
4,531,350	06/649,062	07/30/85
4,531,353	06/539,096	07/30/85
4,531,360	06/423,859	07/30/85
4,531,362	06/701,644	07/30/85
4,531,367	06/404,330	07/30/85
4,531,381	06/647,760	07/30/85
4,531,383	06/563,162	07/30/85
4,531,384	06/515,761	07/30/85
4,531,393	06/540,795	07/30/85
4,531,401	06/564,914	07/30/85
4,531,404	06/566,727	07/30/85
4,531,414	06/612,335	07/30/85
4,531,429	06/505,923	07/30/85
4,531,437	06/544,622	07/30/85
4,531,446	06/401,844	07/30/85
4,531,452	06/554,553	07/30/85
4,531,455	06/569,243	07/30/85
4,531,458	06/513,201	07/30/85
4,531,465	06/595,614	07/30/85
4,531,469	06/559,274	07/30/85
4,531,472	06/554,548	07/30/85
4,531,473	06/484,617	07/30/85
4,531,477	06/595,709	07/30/85
4,531,480	06/438,647	07/30/85
4,531,492	06/593,982	07/30/85
4,531,497	06/492,708	07/30/85
4,531,498	06/228,861	07/30/85
4,531,499	06/401,286	07/30/85
4,531,506	06/604,382	07/30/85
4,531,513	06/553,031	07/30/85
4,531,517	06/478,301	07/30/85
4,531,518	06/531,066	07/30,85
4,531,519	06/621,881	07/30/85
4,531,525	06/554,935	07/30/85
4,531,530	06/531,735	07/30/85
4,531,553	06/555,592	07/03/85
4,531,567	06/448,790	07/30/85
4,531,574	06/453,636	07/30/85
4,531,577	06/388,607	07/30/85
4,531,600	06/556,316	07/30/85
4,531,607	06/615,915	07/30/85
4,531,613	06/603,252	07/30/85
4,531,619	06/423,220	07/30/85
4,531,624	06/274,405	07/30/85
4,531,632	06/602,004	07/30/85
4,531,633	06/416,957	07/30/85
4,531,634	06/565,696	07/30/85
4,531,635	06/595,562	07/30/85
4,531,637	06/583,248	07/30/85
4,531,638	06/553,362	07/30/85
4,531,640	06/531,431	07/30/85
4,531,642	06/567,667	07/30/85
4,531,655	06/504,613	07/30/85
4,531,674	06/506,359	07/30/85
4,531,675	06/545,089	07/30/85
4,531,679	06/623,535	07/30/85
4,531,685	06/474,355	07/30/85
4,531,686	06/532,542	07/30/85
4,531,688	06/531,294	07/30/85

Patent Number	Serial Number	Issue Date
4,531,690	06/588,360	07/30/85
4,531,696	06/375,827	07/30/85
4,531,706	06/500,813	07/30/85
4,531,714	06/536,349	07/30/85
4,531,715	06/619,268	07/30/85
4,531,719	06/469,618	07/30/85
4,531,728	06/637,550	07/30/85
4,531,731	06/569,278	07/30/85
4,531,736	06/578,472	07/30/85
4,531,737	06/574,527	07/30/85
4,531,739	06/611,469	07/30/85
4,531,741	06/625,132	07/30/85
4,531,742	06/546,880	07/30/85
4,531,743	06/435,907	07/30/85
4,531,744	06/581,619	07/30/85
4,531,749	06/500,212	07/30/85
4,531,750	06/678,757	07/30/88
4,531,752	06/452,067	07/30/85
4,531,770	06/459,309	07/30/85
4,531,771	06/340,573	07/30/85
4,531,772	06/679,085	07/30/85
4,531,774	06/472,116	07/30/85
4,531,784	06/476,226	07/30/85
4,531,785	06/445,254	07/30/85
4,531,794	06/574,380	07/30/85
4,531,804	06/498,402	07/30/85
4,531,806	06/555,051	07/30/85
4,531,815	06/500,808	07/30/85
4,531,816	06/516,309	07/30/85
4,531,821	06/560,128	07/30/85
4,531,836	06/473,326	07/30/85
4,531,840	06/561,219	07/30/85
4,531,843	06/470,478	07/30/85
4,531,847	06/555,790	07/30/85
4,531,849	06/655,939	07/30/85
4,531,856	06/388,511	07/30/85
4,531,858	06/542,176	07/30/85
4,531,861	06/523,117	07/30/85
4,531,873	06/495,587	07/30/85
4,531,874	06/495,586	07/30/85
4,531,880	06/509,194	07/30/85
4,531,883	06/448,023	07/30/85
4,531,884	06/441,641	07/30/85
4,531,886	06/482,029	07/30/85
4,531,890	06/460,249	07/30/85
4,531,896	06/591,021	07/30/85
4,531,899	06/526,153	07/30/85
4,531,918	06/586,718	07/30/85
4,531,924	06/500,890	07/30/85
4,531,926	06/512,540	07/30/85
4,531,929	06/524,246	07/30/85
4,531,931	06/464,096	07/30/85
4,531,938	06/511,251	07/30/85
4,531,940	06/524,643	07/30/85
4,531,942	06/593,545	07/30/85
4,531,947	06/593,626	07/30/85
4,531,952	06/625,772	07/30/85
4,531,957	06/570,379	07/30/85
4,531,963	06/431,906	07/30/85
4,531,964	06/527,493	07/30/85
4,531,965	06/443,373	07/30/85
4,531,968	06/595,225	07/30/85
4,531,975	06/573,597	07/30/85
4,531,989	06/596,345	07/30/85
4,532,001	06/452,920	07/30/85
4,532,017	06/446,626	07/30/85
4,532,026	06/395,865	07/30/85
4,532,030	06/533,201	07/30/85
4,532,040	06/605,750	07/30/85
4,532,049	06/608,884	07/30/85
4,532,050	06/643,739	07/30/85
4,532,074	06/622,646	07/30/85
4,532,083	06/437,768	07/30/85
4,532,084	06/513,537	07/30/85
4,532,090	06/505,307	07/30/85
4,532,096	06/493,092	07/30/85
4,532,101	06/435,791	07/30/85
4,532,102	06/500,107	07/30/85
4,532,114	06/505,027	07/30/85
4,532,118	06/594,913	07/30/85
4,532,128	06/651,654	07/30/85
4,532,136	06/570,225	07/30/85
4,532,138	06/528,494	07/30/85
4,532,146	06/607,712	07/30/85
4,532,160	06/521,759	70/30/85
4,532,162	06/489,854	07/30/85
4,532,163	06/469,619	07/30/85
4,532,174	06/509,805	07/30/85
4,532,194	06/530,050	07/30/85
4,532,195	06/563,874	07/30/85
4,532,197	06/495,251	07/30/85
4,532,209	06/415,129	07/30/85
4,532,218	06/278,548	07/30/85
4,532,225	06/639,273	07/30/85
4,532,227	06/218,610	07/30/85
4,532,230	06/506,559	07/30/85
4,532,234	06/530,085	07/30/85
4,532,251	06/446,802	07/30/85
4,532,256	06/560,655	07/30/85
4,532,277	06/565,589	07/30/85
4,532,292	06/624,599	07/30/85
4,532,318	06/647,947	07/30/85
4,532,324	06/573,772	07/30/85
4,532,334	06/437,281	07/30/85
4,532,357	06/613,570	07/30/85
4,532,359	06/602,570	07/30/85
4,532,363	06/615,328	07/30/85
4,532,364	06/533,915	07/30/85
4,532,367	06/412,851	07/30/85
4,532,385	06/300,721	07/30/85
4,532,398	06/446,050	07/30/85
4,532,399	06/661,270	07/30/85
4,532,410	06/531,407	07/30/85
4,532,412	06/506,667	07/30/85
4,532,416	06/455,044	07/30/85
4,532,431	06/431,119	07/30/85
4,532,440	06/438,750	07/30/85
4,532,460	06/397,261	07/30/85
4,532,462	06/607,635	07/30/85
4,532,464	06/565,864	07/30/85
4,532,465	06/513,004	07/30/85
4,532,471	06/373,984	07/30/85
4,532,475	06/585,925	07/30/85
4,532,493	06/572,243	07/30/85
4,532,510	06/391,765	07/30/85
4,532,526	06/486,937	07/30/85
4,532,538	06/347,030	07/30/85
4,532,542	06/481,187	07/30/85
4,532,572	06/551,468	07/30/85
4,532,580	06/593,181	07/30/85
4,532,595	06/446,246	07/30/85
4,532,614	06/269,427	07/30/85
4,532,620	06/400,232	07/30/85
4,532,622	06/547,143	07/30/85
4,532,623	06/590,794	07/30/85
4,532,634	06/531,921	07/30/85
4,532,643	06/419,936	07/30/85

NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41 (c); 37 CFR 1.378)

The patent(s) listed below are considered as not having expired but are subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,443,198	06/364,769	04/17/84	04/02/82	09/18/89
4,455,450	06/305,739	06/19/84	09/25/81	09/18/89

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1,21(b)).

Re. 32,201, Re. S. N. 401,725, Filed Aug. 21, 1989, Cl. 340/747, APPARATUS AND METHOD FOR READING AND WRITING TEXT CHARACTER IN A GRAPHICS DISPLAY, David J. Bradley, Owner of Record: *International Business Machines Corp., Armonk, N.Y.*, Attorney or Agent: Alan J. Kasper, Ex. Gp.: 264

4,396,994, Re. S. N. 397,342, Filed Aug. 22, 1989, Cl. 364, DATA SHIFTING AND ROTATNG APPARATUS, Sung M. Kang, Owner of Record: *A.T.& T. Bell Telephone Laboratories, Murray Hill, N.J.*, Attorney or Agent: D. I. Caplan, Ex. Gp.: 237

4,465,969, Re. S. N. 06/893,434, Filed Aug. 5, 1988, Cl. 324/96, VOLTAGE AND ELECTRIC FIELD MEASURING DEVICE USING LIGHT, Koji Tada et al., Owner of Record: *Sumitomo Electric Industries, Ltd., Osaka, Japan,* Attorney or Agent: Darryl Mexic, Ex. Gp.: 267

4,690,714, Re. S. N. 400,517, Filed Aug. 30, 1989, Cl. 437/208, METHOD OF MAKING ACTIVE SOLID STATE DEVICES, Chou H. Li, Owner of Record: *Inventor,* Attorney or Agent: Ivan S. Kavrukov, Ex. Gp.:114

4,694,385, Re. S. N. 403,556, Filed Sept. 6, 1989, Cl. 363/19, SWITCHED-MODE POWER SUPPLY WITH DELAY NETWORK TO REDUCE SWITCHING LOSSES, Antonius A. M. Marinus, Owner of Record: *U. S. Philips Corp., New York, N. Y.*, Attorney or Agent: Bernard Franzblau, Ex. Gp.: 212

4,707,095, Re. S. N. 370,589, Filed June 21, 1989, Cl. 354/173, FILM REWINDER, Yoshiyuki Nakako et al., Owner of Record: *Nikon Corp., Tokyo, Japan,* Attorney or Agent: Mitchell W. Shapiro, Ex. Gp.: 211

4,719,862, Re. S. N. 400,312, Filed Aug. 3, 1989, Cl. 111/7, BLADE SHANK ASSEMBLY USED IN A FERTILIZER APPLICATOR ASSEMBLY, Delmar D. Edmisson, Owner of Record: *Adams Hard-Facing Company, Inc., Guymon, Okla.,* Attorney or Agent: William R. Laney, Ex. Gp.: 331

4,721,783, Re. S. N. 394,247, Filed Aug. 15, 1989, Cl. 544, ANTI-SPASMODIC AGENTS HAVING A HETEROCYCLIC RING, William M. Davis, Owner of Record: *United Pharmaceuticals Inc.*, Attorney or Agent: Austin R. Miller, Ex. Gp.: 129

4,732,028, Re. S. N. 402,658, Filed Sept. 5, 1989, Cl. 72/190, ROTARY APPARATUS, Ernest R. Bodnar, Owner of Record: *Inventor,* Attorney or Agent: George A. Rolston, Ex. Gp.:321

4,742,279, Re. S. N. 402,001, Filed Aug. 31, 1989, Cl. 315/382, COLOR DISPLAY TUBE WITH REDUCED DEFLECTION DEFOCUSSING, Jan Gerritsen et al., Owner of Record: *U. S. Philips Corp., Tarrytown, N.Y.*, Attorney or Agent: Thomas A. Briody, Ex. Gp.: 252

4,751,154, Re. S. N. 404,309, Filed Aug. 31, 1989, Cl. 429/53, BATTERY EXPLOSION ATTENUATION MATERIAL AND METHOD, Richard R. Binder et al., Owner of Record: *Globe Union Inc., Milwaukee, Wis.*, Attorney or Agent: Edward L. Levine, Ex. Gp.: 114

4,759,642, Re. S. N. 402,545, Filed Aug. 18, 1989, Cl. 383/63, RECLOSABLE BAG ESPECIALLY SUITABLE FOR CEREAL PACKAGING AND METHOD, Donald L. Vanerden, Owner of Record: *Minigrip Inc., Orangeburg, N.Y.*, Attorney or Agent: Richard J. Schwarz, Ex. Gp.: 241

4,802,428, Re. S. N. 399,602, Filed Aug. 28, 1989, Cl. 114/61, PLANING CATAMARAN VESSEL, Thomas G. Lang, Owner of Record: *Inventor*, Attorney or Agent: Carl R. Brown, Ex. Gp.: 315

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,567,738, Reexam. No. 90/001,839, Requested Aug. 14, 1989, Cl. 66/85, STRUCTURAL FABRIC AND METHOD OF MAKING SAME, Harold K. Hutson et al., Owner of Record: *Hexcel Corp. , Minneapolis, Minn.*, Attorney or Agent: Unknown, Ex. Gp.: 240, Requester: Burlington Industries, Inc., Greensboro, N. C.

4,574,614, Reexam. No. 90/001,838, Requested Sept. 8, 1989, Cl. 72/447, APPARATUS FOR REPAIRING AND STRAIGHTENING VEHICLES, Carl R. Field, Owner of Record: *Doz-Mor, Inc., Des Moines, Iowa,* Attorney or Agent: Henderson & Sturm, Ex. Gp.: 320, Requester: Hein-Werner, Corp., Waukesha, Wis.

4,631,215, Reexam. No. 90/001,842, Requested Sept. 12, 1989, Cl. 428/105, EXTRUDED ARTICLE AND METHOD OF MAKING THE SAME, Dennis G. Welygan, Owner of Record: *The Minnesota Mining & Manufacturing Co., St. Paul, Minn.*, Attorney or Agent: Richard Francis, Ex. Gp.: 150, Requester: Owner

4,634,485, Reexam. No. 90/001,843, Requested Sept. 12, 1989, Cl. 156/244, EXTRUDED ARTICLE AND METHOD OF MAKING THE SAME, Dennis G. Welygan, et al., Owner of Record: *The Minnesota Mining & Manufacturing Co., St. Paul, Minn.* Attorney or Agent: Richard Francis, Ex. Gp.: 150, Requester: Owner

4,742,050, Reexam. No. 90/001,840, Requested Sept. 11, 1989, Cl. 514/34, SENSITIZATION OF HYPOXIC TUMOR CELLS AND CONTROL OF GROWTH THEREOF, John M. Yuhas, et al., Owner of Record: *Adamantech Inc., Linwood, Pa.*, Attorney or Agent: Donald R. Johnson, Ex. Gp.: 180, Requester: Owner

4,758,457, Reexam. No. 90/001,841, Requested Sept. 9, 1989, Cl. 428/82, FLOOR MAT WITH INTEGRAL RETAINER MEANS, Mark Altus, Owner of Record: *The 2500 Corp., Birmingham, Miss.*, Attorney or Agent: D. E. Dolgorukov, Ex. Gp.: 150, Requester: Owner

4,797,170, Reexam. No. 90/001,837, Requested Sept. 6, 1989, Cl. 156/71, SYSTEM FOR HOLDING CARPET IN PLACE WITHOUT STRETCHING, Merle R. Hoopengardner, Owner of Record: *Jactac Inc., Lafayette, Calif.*, Attorney or Agent: Unknown, Ex. Gp: 130, Requester: Orcon Corp., Union City, Calif.

Service by Publication

A petition to cancel the registration identified below having been filed, and the notice of such proceeding sent by registered mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives, shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Santa Cruz Imports, Inc., South San Francisco, Calif., Reg. No. 1,275,314, for the mark "SANTA CRUZ" and design, Canc. No. 17,900

ERMA S. BROWN
Asministrator of the Trademark Trial and Appeal Board
For JEFFREY M. SAMUELS
Assistant Commissioner for Trademarks

Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by certified mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Hampton Shops, Patterson, N.J., Reg. No. 539,850, for the mark "HAMPTON FURNITURE SHOPS", Canc. No. 17,471.

Eco Pump Corporation, South Plainfield, N. J., Reg. No. 947,214, for the mark "CHEM-X", Canc. No. 17,623.

Advance Schools, Inc., Chicago, Ill., Reg. No. 1,002,397, for the mark "A NEW SCHOOL OF THOUGHT", Canc, No. 17,665.

Sanger Fruit Growers Association, Sanger, Calif., Reg. No. 182,747, for the mark "ROSE", Canc. No. 17,767.

Alpha Designs, Inc., Cincinnati, Ohio, Reg. No. 922,633, for the mark "DIAPERMATE", Canc. no. 17,803.

Anabolic, Inc., Glendale, Calif., Reg. No. 443,689, for the mark "NUTRI-NEWS", Canc. No. 17,839.

Prosol Corporation, Milltown, N.J., Reg. NO. 1,277,194, for the mark "PROTACK", Canc. No. 17,871.

Jarco Manufacturing Corp., Patterson, N.J., Reg. No. 588,148, for the mark "FLIPPO", Canc. No. 17,987.

Martin Geller, dba Artbeats, Brooklyn, N.Y., Reg. No. 1,288,991, for the mark "ARTBEATS", Canc. No. 18,008.

ERMA S. BROWN
Administrator of the Trademark Trial and Appeal Board
For JEFFREY M. SAMUELS
Assistant Commissioner for Trademarks

REGISTRATION TO PRACTICE

The following list contains the names of persons applying for registration to practice before the United States Patent and Trademark Office. These persons have been given provisional recognition pursuant to 37 CFR 10.9(a) to prepare and prosecute patent applications before the Office. Final approval for registration is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Discipline that the person seeking registration is of good moral character and repute. [37 CFR 10.7 (a)]. Accordingly, any information tending to affect the eligibility of any of the following applicants on moral, ethical, or other grounds should be furnished the Director, Office of Enrollment and Discipline on or before November 13, 1989:

Andes, William Scott, 3585 Miller Rd., Springfield, Ohio 45502
Burnett, Robert F., 6322 Alberta St., Springfield, Va. 22152
Crosby, Gene P., 2201 Scroggins Rd., Alexandria, Va. 22302
Feldman, Peter, 8802 Liberty La., Potomac, Md. 20854
Forrer, Donald D., 1260 Chanler La., Bowie, Md. 20715
Gubernick, Franklin L., 1420 Nott St., Schenectady, N.Y. 12308
Kucia, Richard R., 1707 Crestwood Dr., Alexandria, Va. 22302
Mackey, Robert R., 6323 Phyllis La., Alexandria, Va. 22312
Nixon, Norman A., 24451 Lake Shore Blvd., Cleveland, Ohio 44123
Showalter, Robert L., Jr., 7116 Creekwater Dr., Centerville, Ohio 45459
Tanenholtz, Alvin E., 12304 Old Canal Rd., Potomac, Md. 20854
Telesz, Andrew J., 4015 North 20th St., Arlington, Va. 22207
Wan, Gene, 613 N. Tazewell St., Arlington, Va.22203

Sept. 22, 1989

CAMERON WEIFFENBACH,
Director of Enrollment and Discipline

PATENT NOTICES

Certificates of Correction For Week of October 17, 1989

B1. 4,526,828	4,787,672	4,801,232	4,816,045
PLT. 6698	4,788,414	4,801,379	4,816,485
RE. 32892	4,788,445	4,801,663	4,816,498
D. 298,883	4,788,599	4,801,666	4,816,588
D. 300,013	4,789,152	4,802,584	4,816,634
4,580,457	4,789,535	4,803,008	4,816,638
4,596,787	4,789,717	4,805,150	4,816,733
4,628,779	4,790,501	4,805,165	4,816,996
4,629,025	4,790,534	4,805,224	4,817,437
4,653,137	4,790,783	4,806,172	4,817,567
4,662,515	4,790,866	4,806,329	4,817,789
4,672,604	4,791,229	4,806,492	4,817,871
4,689,129	4,791,631	4,808,459	4,817,970
4,715,217	4,791,920	4,809,054	4,818,076
4,726,210	4,792,157	4,809,344	4,818,290
4,745,159	4,792,480	4,809,403	4,818,729
4,749,269	4,792,635	4,809,676	4,818,879
4,760,072	4,792,668	4,810,000	4,819,120
4,762,532	4,793,169	4,810,072	4,819,155
4,764,061	4,793,408	4,810,143	4,820,992
4,767,087	4,793,421	4,810,171	4,821,065
4,767,586	4,793,531	4,811,199	4,821,223
4,768,787	4,794,162	4,811,493	4,822,624
4,770,224	4,794,212	4,811,494	4,823,858
4,771,002	4,794,233	4,811,685	4,823,898
4,771,301	4,794,409	4,811,910	4,823,995
4,774,294	4,794,716	4,812,316	4,824,000
4,774,918	4,795,713	4,812,642	4,824,139
4,776,193	4,796,648	4,812,824	4,824,672
4,776,676	4,797,330	4,813,132	4,827,035
4,778,738	4,797,344	4,813,159	4,827,272
4,778,821	4,797,627	4,813,325	4,828,439
4,781,441	4,798,081	4,813,501	4,829,076
4,782,247	4,798,115	4,813,503	4,829,294
4,782,732	4,798,208	4,815,055	4,831,165
4,783,257	4,798,676	4,815,320	4,831,547
4,784,123	4,799,550	4,815,512	4,836,935
4,784,578	4,801,026	4,815,814	

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PATENT APPLICATION	New patent application and associated papers and fees.
TRADEMARK APPLICATION	New trademark application and associated papers and fees.
Box Assignments	All assignment documents except those filed in new patent applications.

Reference Collection of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to informatiсn contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

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Arkansas	Little Rock: Arkansas State Library	(501) 682-2053
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale Patent Clearinghouse	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2347
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Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
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	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 455-8027
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	Houston: The Fondren Library, Rice University	(713) 572-8101 Ext.2587
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Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin Madison	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF September 9, 1989

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action

CHEMICAL EXAMINING GROUPS

GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director 5-26-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director 6-16-87
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director 4-15-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director 5-14-87
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director 7-30-86

ELECTRICAL EXAMINING GROUPS

INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director 5-4-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director 12-23-86
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director 5-28-87
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director 5-27-88
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director 8-18-87
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260 S. LEVY, Acting Director 7-2-87
DESIGN, GROUP 290—K. L. CAGE, Director 2-6-86

MECHANICAL EXAMINING GROUPS

HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director 1-12-88
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director 4-13-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director 4-20-87
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director 2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director 10-3-88

Expiration of patents: The patents within the range of numbers indicated below expire during September 1989, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,688,314 to 3,694,813 inclusive
Plant Patents ..... None

REEXAMINATIONS

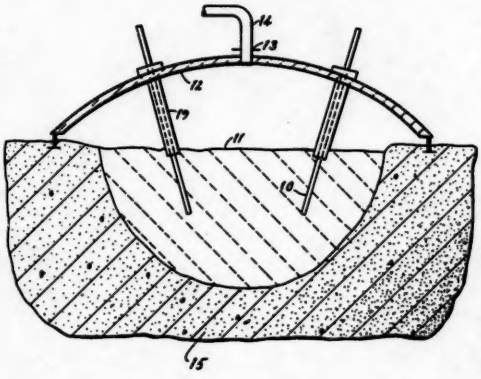
OCTOBER 17, 1989

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,376,598 (1142nd)
IN-SITU VITRIFICATION OF SOIL

Richard A. Brouns, Kennewick; James L. Buelt, and William F. Bonner, both of Richland, all of Wash., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Reexamination Request No. 90/001,507, May 5, 1988.
Reexamination Certificate for Patent No. 4,376,598, issued Mar. 15, 1983, Ser. No. 251,663, Apr. 6, 1981.
Filed May 5, 1988, Ser. No. 251,663
Int. Cl.[4] E02D *3/00*
U.S. Cl. 405—258



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 5, 10, and 12–14 are cancelled.

Claims 1–3, 6 and 8 are determined to be patentable as amended.

Claims 4, 7, 9, 11 and 15, dependent on an amended claim, are determined to be patentable.

New claims **16–31** are added and determined to be patentable.

1. A method for in-situ vitrification of soil, comprising the following steps:

inserting at least one pair of electrodes into [the] soil *in the ground* at spaced positions from one another;

providing an initial electrically conductive resistance path in the soil across the electrodes;

passing electrical current through the electrically conductive resistance path by application of current to the electrodes to heat the soil about the path to its melting temperature, thereby establishing a current-carrying pathway through the molten soil between the electrodes;

continuing application of current to the electrodes until the soil between them and immediately adjacent to them has been melted; [and]

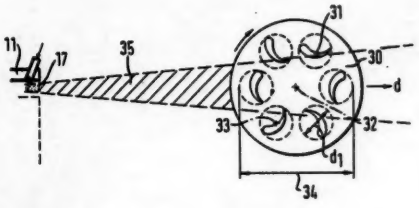
retaining said melted soil in the ground; and

terminating application of current to the electrodes to permit cooling and solidification of *substantially all* the melted soil *in situ between the electrode positions* into a solid mass.

B1 4,596,718 (1143rd)
VACUUM PLASMA COATING APPARATUS

Heiko Gruner, Beinwiel am See, Switzerland, assignor to Plasmainvent AG, Zug, Switzerland

Reexamination Request No. 90/001,486, Apr. 6, 1988.
Reexamination Certificate for Patent No. 4,596,718, issued Jun. 24, 1986, Ser. No. 746,105, Jun. 18, 1985.
Filed Apr. 6, 1988, Ser. No. 746,105
Claims priority, application Fed. Rep. of Germany, Jun. 19, 1984, 3422718
Int. Cl.[4] B05D *1/08*
U.S. Cl. 427—34



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1 and 11 are determined to be patentable as amended.

Claims 2–10, dependent on an amended claim, are determined to be patentable.

1. Vacuum plasma coating apparatus comprising: means for supporting a plurality of parts to be coated in a manner for moving the parts with a plurality of degrees of freedom; and a plasma torch for producing a plasma jet and arranged in a *vacuum* chamber for displacement along a plurality of axes relative to the part to be coated; said means for moving the parts to be coated being arranged to move the parts simultaneously or sequentially through the plasma jet, the part nearest the plasma torch at any moment being arranged in the plasma jet in such manner that the jet extends at least occasionally laterally beyond an outer dimension of the part, and all parts to be coated moving within a predetermined spray distance range when they are located in the plasma jet, *said predetermined spray distance range defined as a distance range from the plasma torch within which a plasma sprayed material remains in at least a softened state, and wherein a plurality of parts are coated simultaneously.*

B1 4,617,052 (1144th)
PROCESS FOR PREPARING A MOTHER ALLOY FOR MAKING AMORPHOUS METAL

Tomoo Takenouchi; Yoshiaki Ichinomiya, and Yoshiyuki Iwanami, all of Hokkaido, Japan

Reexamination Request No. 90/001,207, Mar. 31, 1987.
Reexamination Certificate for Patent No. 4,617,052, issued Oct. 14, 1986, Ser. No. 771,078, Aug. 30, 1985.
Filed Mar. 31, 1987, Ser. No. 771,078
Claims priority, application Japan, Jan. 28, 1985, 60-12489
Int. Cl.[4] C21C *33/00*
U.S. Cl. 420—129

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1–10 are cancelled.

[1. A process for preparing a mother alloy for making a Fe-B-Si base amorphous metal, comprising the steps of:
providing a molten metal containing an iron source and ferrosilicon;
adding to the molten metal a mineral ore containing a boron oxide;
reducing a predetermined amount of the boron oxide in the molten metal by the reducing action of carbon or aluminum that is initially present in the metal or externally added together with the mineral ore, thereby dissolving said boron oxide as elemental boron in the molten metal;
removing the carbon or aluminum by supplying an oxidant; and
adjusting the contents of boron and silicon in the molten metal to be within a desired composition range.]

B1 Des. 273,843 (1141st)

CONTAINER BODY

Kenard E. Urion, Woodbury, N.J., assignor to Scott Paper Co., Philadelphia, Pa.

Reexamination Request No. 90/001,526, Jun. 17, 1988.
Reexamination Certificate for Patent No. Des. 273,843, issued May 15, 1984, Ser. No. 232,279, Feb. 6, 1981.
Filed Jun. 17, 1988, Ser. No. 232,279
U.S. Cl. D9—339

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim 1 is cancelled.

REISSUES

OCTOBER 17, 1989

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

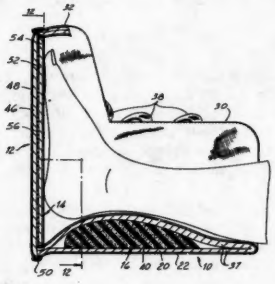
Re. 33,090
ISOTHERMIC PROTECTIVE BOOT

Ramon Berguer, West Bloomfield, Mich., assignor to Lunax Corporation, New Baltimore, Mich.

Original No. 4,369,588, dated Jan. 25, 1983, Ser. No. 227,367, Jan. 22, 1981. Application for reissue May 27, 1988, Ser. No. 199,921

Int. Cl.[4] A43B *1/02, 1/10, 7/14*

U.S. Cl. 36—9 R **5 Claims**



19. An isothermic protective boot having a foot-receiving part and a contiguous leg-receiving part adapted to extend up to at least the lower portion of the calf of a lower extremity of a patient, said boot having a complete inner lining of relatively soft, non-allergenic material, said boot also having a layer of relatively soft, flexible, compressible isothermic protective material throughout the full extent of both its parts, a body of flexible, compressible weight-bearing material along at least a portion of the back of said leg-receiving part in a position to extend along the heel cord of the patient such that when the patient is lying on his back the weight-bearing surface of the extremity of the patient will be over the heel cord and lower aspect of the calf thus relieving the bottom of the heel of any substantial weight bearing, said boot being sufficiently flexible to afford the patient at least limited ambulation, the exterior of said boot being soft and devoid of hard surfaces and sharp edges to preclude injury to the patient's other extremity, said boot having confronting edges at the front permitting said boot to be opened along said confronting edges to apply and remove said boot, said boot being adapted to cover and protect the lower calf portion and foot of the patient from the rear of the boot around the sides thereof to said confronting edges at the front of the boot, and releasable fastening means for the front of said boot adapted to provide a connection between said confronting edges.

Re. 33,091
ASH DISPOSAL DAMPER FOR BARBECUE KETTLE

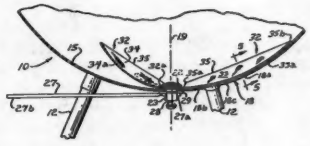
Erich J. Schlosser, Lindenhurst, Ill., assignor to Weber-Stephen Products Co., Palatine, Ill.

Original No. 4,624,239, dated Nov. 25, 1986, Ser. No. 804,446, Dec. 4, 1985. Continuation-in-part of Ser. No. 222,125, Jan. 22, 1981, abandoned. Application for reissue Nov. 21, 1985, Ser. No. 800,584

Int. Cl.[4] F24C *1/16*

U.S. Cl. 126—9 B **13 Claims**

1. In a kettle-type barbecue grill having a [generally hemispheroidal] bottom extending around a center vertical axis and having a plurality of air intake openings equally circumferentially-spaced around said bottom with damper means for covering said air intake openings, the improvement of said damper means including a post rotatable about said vertical axis and having a removable radial arm for each of said openings retained thereon and extending therefrom, said removable arms being maintained at a predetermined angular orientation on said post, said bottom having an aperture aligned with said vertical axis and said post being received into said aperture,



and a handle secured to said post below said bottom, and releasably retained on said post to retain said post in said aperture, so that said arms can be telescoped on said post, and said post can be inserted into said aperture and retained therein by said handle without the use of any tools.

Re. 33,092
HIGH STRENGTH WELDABLE ALUMINUM BASE ALLOY PRODUCT AND METHOD OF MAKING SAME

Robert E. Sanders, Jr., and Jocelyn I. Petit, both of New Kensington, Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Original No. 4,610,733, dated Sep. 9, 1986, Ser. No. 683,021, Dec. 18, 1984. Application for reissue Jun. 8, 1987, Ser. No. 76,051

Int. Cl.[4] C22F *1/04*

U.S. Cl. 148—12.7 A **23 Claims**

FROM ABOVE 5-7.0 WT.% COPPER
0.1-0.30 WT.% MAGNESIUM
0-0.8 WT.% MANGANESE
BALANCE ALUMINUM
0.1 WT.% TITANIUM
0-0.25 WT.% VANADIUM
0-0.25 WT.% ZIRCONIUM
COLD WORK 6-20% AFTER SOLUTION HEAT TREATMENT AND QUENCHING
AGE 2-24 HOURS AT 250-370°F
HIGH STRENGTH WELDABLE ALUMINUM BASE ALLOY PRODUCT WITH RESISTANCE TO STRESS-CORROSION CRACKING

15. A method of making an aluminum base alloy product characterized by high strength including high resistance to ballistic penetration, resistance to stress-corrosion cracking, and weldability, comprising the steps of:

(a) forming an alloy consisting essentially of from above 5 wt. % to 7 wt. % copper, 0 to 0.8 wt. % manganese, 0.1 wt. % titanium *max.*, 0 to 0.25 wt. % vanadium, 0 to 0.25 wt. % zirconium and 0.1 to 0.3 wt. % magnesium with the balance consisting essentially of aluminum;

(b) cold working the alloy an amount equal to at least 6% stretching at room temperature after solution heat treatment and quenching: and

(c) aging the cold worked alloy for at least 2 hours at a temperature of at least 121° C. (250° F.).

Re. 33,093

BIOADHESIVE EXTRUDED FILM FOR INTRA-ORAL DRUG DELIVERY AND PROCESS

Michael T. Schiraldi, East Brunswick, N.J.; Martin M. Perl, Brooklyn, N.Y., and Howard Rubin, Rockaway, N.J., assignors to Johnson & Johnson Consumer Products, Inc., New Brunswick, N.J.

Original No. 4,713,243, dated Dec. 15, 1987, Ser. No. 874,904, Jun. 16, 1986. Application for reissue Nov. 16, 1988, Ser. No. 272,354

Int. Cl.[4] A01N *59/10;* **A61K** *33/16*

U.S. Cl. 424—676 **9 Claims**

1. A pharmaceutically acceptable controlled-releasing medicament-containing extruded single or multi-layered thin film, capable of adhering to a wet mucous surface, comprising a water soluble or swellable polymer matrix bioadhesive layer which can adhere to a wet mucous surface and which bioadhesive layer consists essentially of [40–95] *20–93%* by weight of a hydroxypropyl cellulose having a molecular weight above 100,000, 5–60% of a homopolymer of ethylene oxide having a molecular weight from 3,000,000 to 5,000,000, 0–10% of a water-insoluble polymer selected from the group consisting of ethyl cellulose, propyl cellulose, polyethylene and polypropylene, and 2–10% of a plasticizer, said film having incorporated therein a pharmaceutically effective amount of said medicament.

Re. 33,094

ELECTROPHOTOGRAPHIC MEMBER WITH ALPHA-SI LAYERS

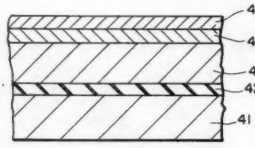
Eiichi Maruyama, Kodaira, Japan; Sachio Ishioka, Burlingame, Calif.; Yoshinori Imamura, Suarashi, Japan; Hirokazu Matsubara, Hamuramachi, Japan; Yasuharu Shimomoto, Hamamatsu, Japan; Shinkichi Horigome, Tachikawa, Japan, and Yoshio Taniguchi, Hino, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Original No. 4,378,417, dated Mar. 29, 1983, Ser. No. 254,294, Apr. 15, 1981. Application for reissue Sep. 11, 1986, Ser. No. 162,312

Claims priority, application Japan, Apr. 16, 1980, 55-49236

Int. Cl.[4] G03G *5/082*

U.S. Cl. 430—57 **16 Claims**



8. [An] *In an* electrophotographic member [according to claim 1,] *comprising at least a predetermined supporter having a conductive surface and an amorphous silicon layer which is electrically in contact with said conductive surface and which contains hydrogen and silicon as indispensable constituent elements thereof, the improvement comprising an amorphous silicon layer in which the silicon amounts to at least 50 atomic % and the hydrogen amounts to at least 1 atomic % and, at most, 50 atomic %, said amorphous layer comprising a first region, a second region, and a third region,*

said first region being at least 10 nm thick, extending inwardly from an outer surface of said amorphous silicon layer and being made of amorphous silicon which has an optical forbidden band gap of at least 1.6 eV and a resistivity of at least 10^{10}Ω.cm;

said second region being located at least 10 nm from said surface of said amorphous layer, having a thickness of at least 10 nm, and being made of amorphous silicon which contains germanium and which has an optical forbidden band gap that is smaller than that of said first region at the surface of the amorphous silicon and that is at least 1.1 eV; and

said third region being located on a side opposite to said surface side formed by said first region and being made of amorphous silicon which has an optical forbidden band gap of at least 1.6 eV and a resistivity of at least 10^{10}Ω.cm, and further comprising a layer on the side of the supporter in electrical contact with the amorphous silicon for suppressing the injection of excess carriers from the supporter side.

Re. 33,095

MAGNESIUM CALCIUM ACETATE PRODUCTS, AND PROCESS FOR THEIR MANUFACTURE

Alan B. Gancy, 265 Robineau Rd., Syracuse, N.Y. 13207

Original No. 46,997,25, dated Oct. 13, 1987, Ser. No. 941,171, Dec. 12, 1986. Application for reissue Mar. 15, 1988, Ser. No. 168,433

Int. Cl.[4] C09K *3/18*

U.S. Cl. 252—70 **15 Claims**

1. An economical process for the manufacture of magnesium calcium acetate hydrate comprising the following steps:

a. introducing finely divided ore containing chemically active calcium oxide and chemically active magnesium oxide to an agitated reaction vessel such that the mol fraction of magnesium in said ore falls within the range 0.68–14 1.0.

b. introducing to said agitation reaction vessel a measured quantity of water such that the number of mols of water is numerically equal to x times the number of mols of said chemically active magnesium oxide, minus one-half the number of moles of acetic acid introduced where x equals 4.5–6;

c. introducing to said agitated reaction vessel a measured amount of acetic acid stoichiometrically equivalent to said chemically active calcium oxide and chemically active magnesium oxide;

d. allowing the product formed through steps a., b. and c. to freeze.

9. A new composition of matter, useful as as surface deicer, having the empirical formula

$$mCa(Ac)_2.n\{Mg(Ac)_2.wH_2O\}.$$

where

n/(m+n)is equal to 0.68–0.99, and W is equal to [3–4] *0–4.*

10. The composition of matter of claim 9 wherein n/(m+n) is equal to 0.8, and w equals [3–4] *0–4.*

Re. 33,096

SEMICONDUCTOR SUBSTRATE

Seiichi Iwamatsu, Suwa, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

Original No. 4,576,851, dated Mar. 18, 1986, Ser. No. 723,708, Apr. 16, 1985. Continuation of Ser. No. 394,070, Jul. 1, 1982, abandoned. Application for reissue Mar. 17, 1988, Ser. No. 171,370

Claims priority, application Japan, Jul. 2, 1981, 56-104298; Jul. 24, 1981, 56-116008

Int. Cl.[4] H01L *27/12, 29/06, 21/305, 21/306*

U.S. Cl. 428—156 **16 Claims**

9. A semiconductor substrate, comprising a single-crystal semiconductor material having a planar surface and an island of the semiconductor material projecting from the surface forming a projecting region and an insulating film having an opening for cooperating with the projecting region to form a smooth surface

with the top of the projecting semiconductor material at substantially the same level as the surface of the remainder of the insulating film and a single-crystal semiconductor film across the top of the projecting region and the insulating film, the projecting region disposed at an edge of said single-crystal semiconductor film.

Re. 33,097

POSITION DETECTOR

Christopher I. Moir, Malvern Link, England, assignor to Helitune Limited, United Kingdom

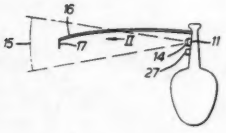
Original No. 4,604,526, dated Aug. 5, 1986, Ser. No. 550,479, Nov. 9, 1983. Application for reissue May 16, 1988, Ser. No. 194,551

Claims priority, application United Kingdom, Nov. 10, 1982, 8232096

Int. Cl.[4] G01N *21/86*

U.S. Cl. 250—561 **14 Claims**

4. [A detector as claimed in claim 1, in which the] *A position detector comprising means defining an elongate field of view, for viewing a target which is arranged to cross the field of view in any of a range of positions along the length of the field of view and which has a reference part, which said* reference part is a slot extending perpendicularly to the length of elongation of the field of view, *a sensor in the form of a line of sensitive elements extending parallel with the field of view and positioned to receive*



an image of the field of view, and electronic means for repeatedly scanning the elements in scanning cycles and for detecting the particular sensitive element which receives the image of the reference part of the target as the target crosses the field of view.

PLANT PATENTS

GRANTED OCTOBER 17, 1989

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,047

SPRAY CARNATION NAMED LONBANKIR

Nicole Barberet-Maiolino, and Henri Blanc, both of Antibes, France, assignors to Etablissements Barberat et Blanc, Laboratoire de Physiologie Vegetale, Les-Maures, France

Filed Oct. 11, 1988, Ser. No. 255,483

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—71 **1 Claim**

1. The new and distinct spray carnation cultivar and the parts thereof, substantially as herein shown and described, characterized in particular by the light purple coloration of its flowers, which are produced profusely at several times during the year, the plant having a vigorous growth habit with abundant foliage and good resistance to *Fusarium oxysporum.*

7,048

SPRAY CARNATION NAMED LONDUCI

Nicole Barberet-Maiolino, and Henri Blanc, both of Antibes, France, assignors to Etablissements: Barberet et Blanc Laboratoire de Physiologie Vegetale, Les-Maures, France

Filed Oct. 11, 1988, Ser. No. 255,482

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—73 **1 Claim**

1. The new and distinct spray carnation variety and the parts thereof, substantially as herein shown and described, characterized by the bright red color of its blossoms, its profuse production of flowers during the Spring, Midseason and Fall growing seasons, its abundant foliage, and its strong, rigid and upright growth habit.

PATENTS

GRANTED OCT. 17, 1989

ERRATA

For CLASS	See PATENT NO.
441-036	4,873,933
131-364	4,874,004
248-097	4,874,141
248-185	4,874,142
285-082	4,874,174
221-221	4,874,236
562-002	4,874,556
562-851	4,874,557
562-894	4,874,558
426-074	4,874,606
148-012	4,874,644
536-055	4,874,752
524-482	4,874,783
355-309	4,874,958
174-052	4,875,138
346-155	4,873,334
548-157	4,873,346
568-319	4,873,363
568-344	4,873,364
568-345	4,873,365
388-814	4,873,473
346-140	4,873,622
065-374	4,873,674
370-058	4,873,694
371-021	4,873,705
328-062	4,873,708

PATENTS

GRANTED OCTOBER 17, 1989

GENERAL AND MECHANICAL

4,873,725
INFANT CARE APRON
Tonia L. Mitchell, 4147 Casey, Norcross, Ga. 30093
Filed Apr. 21, 1988, Ser. No. 184,185
Int. Cl.[4] A41D *13/04*
U.S. Cl. 2—48 **7 Claims**

1. An apron-type garment adapted to be worn by a caregiver for an infant comprising:

a. a front panel fabricated from an air permeable, multilayered material which gives the front panel sufficient rigidity that sections of the front panel situated proximate any depressions in the contour of the caregiver's body and tend to bridge the depressions so that the front panel forms a shield that makes only minimal contact with the caregiver's body;

b. means for securing the mid-section of the front panel about the caregiver's waist;

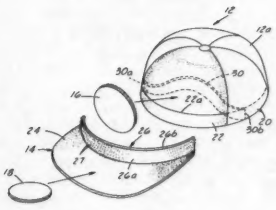
c. rear panels that are approximately one-half as long as the front panel, the rear panels being fabricated from the multilayered material; upper edges of the front panel and of first and second rear panels being joined together to form first and second junctures, respectively; the rear panels together covering most of the caregiver's back above the waist, contiguous portions of the front panel and of the rear panels covering the caregiver's shoulders and extending laterally therefrom; each of the rear panels having an inner edge, the inner edges being disposed proximate and alignable generally parallel to each other;

d. the front panel and the rear panels defining an opening which is sized large enough for the caregiver's head, the opening being disposed between the first and second junctures;

e. means for adjusting the size of the opening, the adjusting means including a pair of ties, each tie being attached to one of the inner edges and positioned so that the pair of ties can be fastened together; the garment, once the size of the opening is properly adjusted, being removable without undoing the fastening between the ties; and

f. any points of attachment between the front panel and the first and second rear panels being disposed within the first and second junctures, respectively, so that the garment can be laid out flat and easily donned in a cape-like fashion.

4,873,726
CAP ASSEMBLY
Ray Tapia, 1740 W. Kenneth Rd., Glendale, Calif. 91201
Filed Jul. 29, 1988, Ser. No. 226,416
Int. Cl.[4] A42B *1/02*
U.S. Cl. 2—195 **6 Claims**



1. A visored cap apparatus comprising:

(a) a crown assembly including:

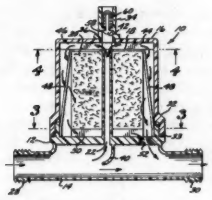
(i) a head covering portion having a circumferentially extending band, said band including an exterior arcuate portion provided with a multiplicity of small first engagement members; and

(ii) an interior flexible guide band having first and second ends affixed to said circumferentially extending band, at circumferentially spaced location, said guide band being movable between a first retracted position and a second extended position; and

(iii) a generally arcuate shaped stiffening band carried by said head covering portion intermediate said first and second ends of said guide band, and

(b) a visor assembly including an eye shade portion and an upstanding generally arcuate shaped portion, said arcuate shaped portion having first and second surfaces, said first surface having a multiplicity of small second engagement members for locking engagement with said first engagement members provided on said arcuate portion of said band of said head covering portion.

4,873,727
MARINE TOILET DEODORANT DISPENSER
Donald A. Homan, Lighthouse Yacht Landing, Birth 203B, Space D-10, Wilmington, Calif. 90744
Filed May 15, 1987, Ser. No. 50,489
Int. Cl.[4] E03D *9/02*
U.S. Cl. 4—226 **29 Claims**



1. A deodorant dispenser for chemically treating the flushing fluid of a marine toilet comprising, in combination:

means for mounting said deodorant dispenser to a flushing fluid line and including a fluid passage therethrough and a

central passage communication with said fluid passage and extending laterally therefrom;

means for admitting said flushing fluid, said admitting means in mechanical communication with said fluid passage for providing an inlet connection;

means for discharging said flushing fluid, said discharging means in mechanical communication with said fluid passage for providing an outlet connection, said admitting and discharging means each being of constant diameter;

fluid collecting means connected to said mounting means for capturing a portion of said flushing fluid in said fluid passage and for routing said portion into said central passage within said deodorant dispenser;

solid chemical block mounted around said central passage, containing means snugly seated within said mounting means for encapsulating said solid chemical block mounted about said central passage, an annular space between said containing means and said block, said containing means having a plurality of vertical slots for directing said flushing fluid to said annular space between said containing means and said block, said containing means being enclosed within a housing means and being easily replaced without contacting said block; and

fluid passing means formed between said containing means and said housing means for passing said flushing fluid from said central passage to said annular space for providing contact between said flushing fluid and said block forming a chemically treated flushing fluid

outlet means formed in said mounting means in fluid communication between said annular space and said fluid passage wherein said housing means cooperates with said central passage for routing said flushing fluid through said dispenser and being threadedly engaged to said mounting means for providing a leakproof seal.

4,873,728

PORTABLE DISINFECTING DEVICE FOR A TOILET SEAT AND OTHER SURFACES

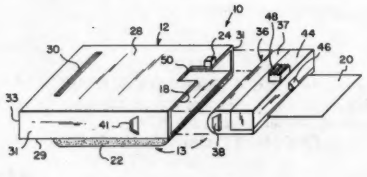
Salvatore Bono, 885 Manor La., Bay Shore, N.Y. 11706

Filed Sep. 14, 1988, Ser. No. 244,019

The portion of the term of this patent subsequent to Dec. 22, 2004, has been disclaimed.

Int. Cl.[4] A47K *17/00*

U.S. Cl. 4—233 **5 Claims**



1. A portable disinfecting device for a toilet seat and other surfaces which comprises:

(a) a housing that will slide on rim width of the toilet seat and against the other surfaces when said housing is manually manipulated said housing including a top wall having a top slot thereacross near one end and a cutout area at other end for mounting an activate button, a bottom wall having a bottom slot thereacross directly below said top slot for receiving a disinfectant tissue and forwarding it through said top slot, a pair of side walls, each having an aperture for receiving a pair of spring biased members, one end wall having an open end opposite said end wall; and

(b) means for disinfecting the toilet seat and the other surfaces, said means disposed in said housing and extends therefrom so as to make contact with the toilet eat and the other surface said disinfecting means including a pair of take-up rollers rotatably mounted within said housing in alignment with said top slot in said top wall and said bottom slot in said bottom wall, a sponge member affixed to underside of said bottom wall of said housing between said bottom slot and said open end, a replaceable refill cartridge which is received within said open end of said housing, said refill cartridge being a casing with a roll of disinfectant tissue therein that extends outwardly from one side, said casing having a pair of spring biased latch members which mate with said apertures in said side wall of said housing, and a dispenser mounted into said refill cartridge for spraying disinfectant liquid therefrom onto said disinfectant tissue that extends outwardly from said casing whereby said disinfectant tissue goes around said sponge member for making contact with the toilet seat and other surfaces, then goes into said bottom slot in said bottom wall of said housing, between said take-up rollers and upwardly through said top slot in said top wall.

4,873,729

AUTOMATIC DEVICE FOR THE DISINFECTION OF W.C. BOWLS AND SEATS

Jacques Micallef, 14 rue Murillo, F-75008 Paris, France

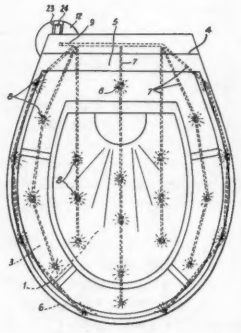
PCT No. PCT/FR84/00264, § 371 Date Jul. 17, 1985, § 102(e) Date Jul. 17, 1985, PCT Pub. No. WO85/02214, PCT Pub. Date May 23, 1985

PCT Filed Nov. 16, 1984, Ser. No. 756,435

Claims priority, application France, Nov. 18, 1983, 83 18364

Int. Cl.[4] A47K *13/00*

U.S. Cl. 4—233 **14 Claims**



1. In a toilet comprising a pan, a fixed seat integral with the upper edge of the pan and a folding seat movable between an upper position and a lower position in which a lower face of said folding seat engages the fixed seat, an automatic disinfection device which comprises:

(a) a folding lid made of molded plastic material, said folding lid being movable between an upper open position and a lower closed position, said folding lid having a plane portion and a curved edge of which the inner surface, in the closed position, registers with the outer edges of the folding seat and of the fixed seat,

(b) a sealing joint fixed to the end portion of the curved edge of the lid and adapted, in the closed position of the lid, to come in close contact with the external peripheral surface of the pan,

(c) molded ducts in the folding lid,

(d) a plurality of dispersal heads provided on the entire inner surface of the plane portion and of the curved edge of the folding lid, said heads being disposed to project a disinfection product on the inner surface of the pan, on the fixed seat and on the upper and lower surfaces of the folding

seat, each dispersal head being connected to one of said ducts,

(e) a main duct molded in a rear part of said folding lid and to which said ducts are connected,

(f) a tank containing a disinfectant product under pressure, disposed in the vicinity of the rear portion of said folding lid,

(g) a flexible duct connecting said main duct to an outlet of the tank,

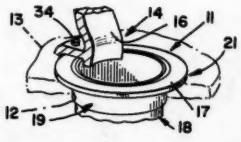
(h) and means on said folding lid adapted to co-act with a control portion of said tank to cause, in the closed position of said lid, said tank outlet to feed the dispersal heads through said flexible duct, said main duct and said ducts with disinfection product.

4,873,730

DISENGAGABLE RING FITTING FOR A TOILET

Casper Cuschera, 1047 - 77th Ave., Oakland, Calif. 94621

Filed Oct. 15, 1985, Ser. No. 787,040
Int. Cl.[4] E03D *11/00*
U.S. Cl. 4—252 R **10 Claims**



1. A fitting for coupling the base of a toilet or the like to a floor and to a drain pipe thereat, the fitting having a cylindrical sleeve proportioned for engagement on the upper end of said drain pipe in coaxial relationship thereon and wherein said sleeve has a flange at the upper end, said fitting further including a ring disposed at the upper end of said sleeve in coaxial relationship therewith, the ring having a plurality of passages through which fasteners may be extended to couple said ring to said floor and to couple said toilet base to said ring, said ring being of larger diameter than said flange of said sleeve and having an inner edge which extends beneath said flange, wherein the improvement comprises:

said ring having a plurality of notches in said inner edge thereof, said notches being at spaced apart locations around said inner edge of said ring, and

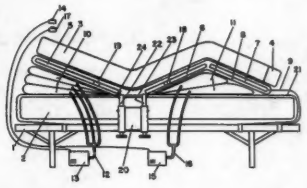
a plurality of ring retainer projections extending radially outwardly from the outer surface of said sleeve beneath said inner edge of said ring, said projections being at locations around the cirumference of said sleeve that are spaced apart by distances corresponding to the spacing of said notches around said inner edge of said ring, said projections being equidistantly spaced from said flange by a distance at least equal to the thickness of said inner edge of said ring to enable movement of said inner edge along the space between said flange and said projections when said ring is rotated to move said notches away from the locations of said projections, said projections being proportioned to pass through said notches to enable separation of said ring from said sleeve when said ring is rotated to bring said notches and projections to the same locations.

4,873,731

ADJUSTABLE BED SYSTEM

Robert M. Williamson, 1708 Matthews La., Austin, Tex. 78745

Continuation-in-part of Ser. No. 54,203, May 26, 1987, Pat. No. 4,839,932. This application Feb. 1, 1989, Ser. No. 305,009
The portion of the term of this patent subsequent to Jun. 20, 2006, has been disclaimed.
Int. Cl.[4] A47C *20/08*; A61G *7/06*
U.S. Cl. 5—68 **2 Claims**



1. An inflatable bed system comprising:

a sectional mattress support frame;

a means for securing a mattress to said frame;

an inflatable member dispositionable beneath a section of said frame to raise and lower said frame;

a means for inflating and deflating said member, said inflating and deflating means further comprising:

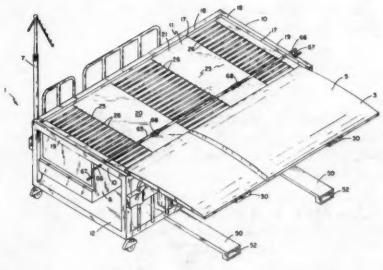
first and second blowers oppositely positioned within a blower housing, said first blower adapted to positively pressurize said inflatable member to raise said frame and said second blower adapted to positively withdraw air from said inflatable member to lower said frame.

4,873,732

TRAUMA STRETCHER

Roberto Perez, 860 Harrison Ave., #1208, Boston, Mass. 02118

Filed Oct. 24, 1988, Ser. No. 261,260
Int. Cl.[4] A61G *7/10*
U.S. Cl. 5—81 B **8 Claims**



1. A trauma stretcher for use in transferring a patient to and from stretcher to bed or operating table, comprising:

a generally rectangular wheeled chassis frame with a top, bottom, two sides and two ends;

a generally flat rectangular platform with top and bottom faces mounted thereon the platform's top face having a plurality of rows of roller bars whereby said rows are parallel to each other and are positioned so that each row is perpendicularly oriented to the platform's longitudinal axis and each individual roller bar is oriented parallel to the platform's longitudinal axis;

a rectangular patient litter with top and bottom faces slidably positioned atop said platform;

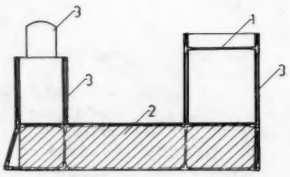
a plurality of extension arms pivotally attached to the sides of said chassis and having means for sliding said litter across;

a plurality of stabilizer legs pivotally attached to the sides of said chassis; and a rod with two ends and a plurality of knurled gears formed concentrically about its surface circumference wherein said rod is positioned across the platform's top face in line with the longitudinal axis of the platform and having its ends inserted through top end crossbars forming a portion of the chassis frame.

4,873,733
TOY BED

Ted T. H. Wang, Room 401, 168, Chung Cheng 4 Road, Kaohsiung, Taiwan

Continuation-in-part of Ser. No. 947,722, Dec. 30, 1986, abandoned. This application May 5, 1988, Ser. No. 188,698
Int. Cl.[4] A47D *7/00*
U.S. Cl. 5—93 R **9 Claims**



1. An assembled toy bed, which comprises a frame, mattress and cover,

the frame comprising tubes and joints, each tube having two ends and each joint having at least two openings for receiving the ends of the tubes, the joints combining the tubes together to form a rigid three dimensional structure having a shape mimicking one of a locomotive, car, ship, submarine and tank,

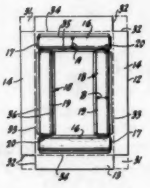
the mattress being tightly surrounded by the frame and stabilizing the frame, and

the cover being made of a single sheet of a material, having a shape corresponding to the frame, and arranged to tightly encompass the frame.

4,873,734
BUMPER SHEET

Dianne J. Pollard, 69 Jackson Way, Alamo, Calif. 94507

Continuation-in-part of Ser. No. 878,292, Jun. 25, 1986, Pat. No. 4,754,509, which is a continuation of Ser. No. 723,109, Apr. 15, 1985, Pat. No. 4,607,402. This application Jul. 1, 1988, Ser. No. 214,084
The portion of the term of this patent subsequent to Aug. 26, 2003, has been disclaimed.
Int. Cl.[4] A47C *21/08*
U.S. Cl. 5—425 **9 Claims**



1. A bumper sheet for covering the top surface of a base such as a mattress within a secure rest area defined by structural members such as crib slats or bed rails for preventing a person or object resting on the mattress from falling off, the bumper sheet comprising:

a sheet of covering material selected from cloth and other flexible materials;

elongated pockets attached along all of the peripheral edges of the top surface of the base for providing a bumper restraint along the associated edge of the sheet and base, the individual pockets comprising a relatively narrow elongated strip of material selected from cloth and other flexible materials attached to the sheet substantially continuously along the length of the strip; and

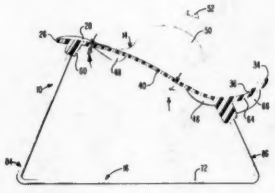
at least one form-retaining insert sized for removable insertion into an associated pocket;

the inserts and associated pockets forming a bumper of configuration defined by the configuration of the associated pockets, for providing a barrier against insertion of body members such as the hands and legs into said structural members.

4,873,735
PERCH FOR INFANTS AND HANDICAPPED INDIVIDUALS

Daniel R. Fermaglich, and Lois F. Fermaglich, both of 9 Van Duyne Rd., Mountain Lakes, N.J. 07046

Continuation-in-part of Ser. No. 867,466, May 23, 1986, abandoned, which is a continuation-in-part of Ser. No. 552,603, Nov. 17, 1983, abandoned. This application Jul. 24, 1987, Ser. No. 77,371
Int. Cl.[4] A47C *20/00*
U.S. Cl. 5—431 **23 Claims**



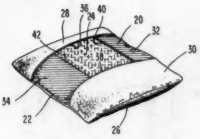
1. A perch for an infant or a handicapped person, comprising supporting means for supporting an individual in a prone, generally fetal-like position in which all of the individual's limbs are freely suspended below the individual's body and in which the individual's head is arranged at a higher elevation than the rest of the individual's body, said supporting means including a support member, having a midsection which is long enough and wide enough to support the individual's chest and abdomen and which is arranged at a first angle inclined relative to the horizontal, an upper end in the form of a ledge which extends outwardly from said midsection far enough to support the individual's head and which is arranged at a second angle inclined relative to the horizontal such that said second angle is less than said first angle, a lower end in the form of a saddle which extends upwardly and outwardly from said midsection far enough to self-support and cradle the individual's buttocks, a first pair of cutouts provided in said midsection of said support member adjacent said lower end thereof, each cutout of said first pair of cutouts being wide enough to receive one leg of the individual such that the individual's legs straddle said support member on opposite sides thereof, and a second pair of cutouts provided in said midsection of said support member adjacent said upper end thereof, each cutout of said second pair of cutouts being wide enough to receive one arm of the individual such that the individual's arms straddle said support member on opposite sides thereof, and a base member attached to said support member such that said support member is positioned a distance above a support surface, said distance being selected such that the individual's limbs are suspended above the support surface.

4,873,736

PILLOW STRUCTURE

William M. Sapp, and Julia E. Harrell, both of Dalton, Ga., assignors to Crown Crafts, Inc., Calhoun, Ga.

Filed Oct. 19, 1987, Ser. No. 109,520
Int. Cl.[4] A47G 9/00
U.S. Cl. 5—434 16 Claims



1. A pillow comprising:

a pillow body having a surface including a first surface portion and a second surface portion, said first and second surface portions being disposed on opposite sides of a plane, said pillow body having a thickness in a direction perpendicular to the plane, said thickness increasing inwardly from the perimeter of the pillow body;

a plurality of panels each having a plurality of edge sections and being connected along at least two of said edge sections to said pillow body, each of said panels being movable between a first position disposed on a first side of the plane adjacent said first surface portion and a second position disposed on a second side of the plane adjacent said second surface portion, each of said plurality of panels covering less than one-half of said first surface portion when each of said panels is positioned in said first position and covering less than one-half of said second surface portion when each of said panels is positioned in said second position; and

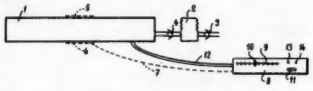
means for releasably maintaining said plurality of panels in said first and second positions so that the panels can be freely moved between the positions to orient the panels in various configurations.

4,873,737

FLUID FILLED MATTRESS WITH HEIGHT MEASURING AND CONTROL DEVICES

Franciscus G. Savenije, Deventer, Netherlands, assignor to Auping B.V., Netherlands

Filed Oct. 9, 1986, Ser. No. 917,219
Claims priority, application Netherlands, Oct. 11, 1985, 8502789
Int. Cl.[4] A47C 27/08, 27/10
U.S. Cl. 5—453 17 Claims



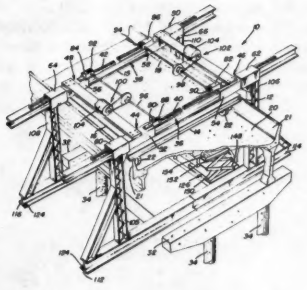
1. A mattress comprising a closed chamber which is filled with a fluid and which is provided with at least one of a means for supplying fluid to the chamber and a means for removing fluid from the chamber, the mattress further comprising at least at one point a measuring device for measuring the distance between the top face of the chamber and the bottom face of the chamber, said measuring device being connected to a device for making use of the measured values, such as a read-off device.

4,873,738

APPARATUS FOR STRIPPING CONCRETE FORMS FROM BRIDGE STRUCTURES

Hal C. Shook, Kensington, Ga., and Carmon D. Holland, Laurel, Miss., assignors to CFC Fabrication Corporation, Chattanooga, Tenn.

Filed Sep. 29, 1988, Ser. No. 250,949
Int. Cl.[4] E01D 21/00
U.S. Cl. 14—1 14 Claims



1. Apparatus for stripping concrete forms from a longitudinally elongated roadbed extending transversely of a multi-section bridge under construction, said roadbed being supported by longitudinally spaced apart piers including pier caps extending a finite distance transversely, said apparatus comprising a carriage having interconnected longitudinally and transversely elongated beams, propulsion means carried on said carriage for selectively propelling said carriage longitudinally along said roadbed between sections of said bridge, a pair of transversely extending carrier beams supported by said carriage at longitudinally spaced positions, each carrier beam being longer than said finite distance and having ends extending transversely beyond a respective end of said pier caps, each carrier beam having means defining transversely extending tracks, a pair of housings carried on each carrier beam and disposed for riding along said tracks, drive means for selectively moving said housings transversely relatively to said carrier beams between first and second positions, a support frame secured to each housing transversely outboard of said roadbed and depending downwardly beneath said roadbed, a work platform support section carried by each support frame beneath said roadbed, each work platform support section comprising a transversely extending beam having an inboard and an outboard end, means defining a transversely extending rail on each work platform support section beam, the inboard ends of the work platform support section beams associated with each carrier beam normally abutting to form a continuous work platform support with a continuous rail when said housings are disposed in said first position and being separated and outboard of a respective transverse end of each pier cap when said housings have been driven to said second position, a longitudinally elongated stripping buggy mounted for movement on said rails, and means for selectively driving said buggy transversely along said rails, whereby concrete forms may be removed onto said buggy from each bridge section in seriatim and transferred to a subsequent bridge section and said apparatus may be moved longitudinally along said bridge from one section to another.

4,873,739

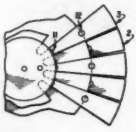
CHIMNEY CLEANING DEVICE

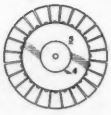
Armando J. Bardini, 136 Hanley Dr., Grass Valley, Calif. 95945

Filed Apr. 5, 1988, Ser. No. 177,601
Int. Cl.[4] F23J 3/00
U.S. Cl. 15—242 2 Claims

1. A chimney cleaning device adapted to move downwardly

into a chimney with reduced contact with the interior walls in one direction and with firm scraping contact with the walls in the opposite direction, the cleaning device comprises two spaced segmented flat membranes, each of said membranes conforming to the shape and size of said chimney, each of said membranes being configured to provide multiple radially extending blade segments, each segment being separated by voids therebetween, each of said membranes being attached between an axially aligned hub member and an axially aligned disc member, said hub members being of a smaller inner diameter and said disc members being of a large outer diameter, said membranes being attached to said hub and disc members one above and parallel to each other, said membranes being oriented so that the blade segments of one membrane are directly above the voids of the other membrane, said two membranes,





in combination, contacting the entire inside surfaces of the chimney, the perimeters of said smaller diameter hubs forming a plurality of inner located bending points for each of the blade segments in order to allow said blade segments to bend upwardly when said cleaning device is moved downwardly into said chimney to thereby provide only light contact of said blade segments with the interior walls, the perimeters of said outer larger diameter disc members forming a plurality of further outwardly located bending points for each of said blade segments in order to allow said blade segments to bend downwardly at said outer bending points when said cleaning device is moved upwardly in the opposite direction to thereby provide a more forcible scraping action of said blade segments against the interior walls of the chimney, wherein each of said blade segments is provided with a hole at each of said bending points to relieve the flexure of said blade segments.

4,873,740

WIPING MIRROR ASSEMBLY

Michael C. Vahrenwald, 2816 Terry Lake Rd., and John A. Brown, 612 Agape Way, both of Fort Collins, Colo. 80524

Filed Mar. 4, 1987, Ser. No. 21,478

Int. Cl.[4] B60S *1/26, 1/44*

U.S. Cl. 15—250 B **56 Claims**

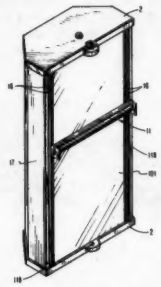
1. A wiping mirror assembly comprising:

a. a mirror having inside and outside surfaces, oppositely-disposed side portions, and oppositely-disposed end portions;

b. a means for wiping said mirror disposed between and perpendicular to said side portions of the mirror and having first and second ends;

c. an upper end plate and a lower end plate, said end plates connected to opposite end portions of said mirror;

d. a means for oscillating said wiper means, said oscillating means having a helical screw disposed between said upper and lower end plates having ascending and descending threads; and



e. a bracket connected to said oscillating means and having first and second ends which are connected to said first and second ends of said wiping means, respectively.

4,873,741

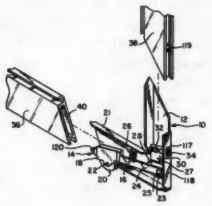
SLIDING DOOR ROLLER APPARATUS

Harry Riegelman, Lewisburg, W. Va., assignor to Columbia Manufacturing Corporation, Gardena, Calif.

Filed Mar. 31, 1987, Ser. No. 32,744

Int. Cl.[4] E05D *13/02*

U.S. Cl. 16—105 **16 Claims**



1. A sliding door roller apparatus comprising:

a mounting bracket; a holding member connected to said mounting bracket; and

a wheel assembly removably mounted to said mounting bracket wherein said wheel assembly includes a wheel, an axle, and a resilient wheel housing having two opposing, resilient sidewalls each sidewall having an integral end portion extending toward the end portion of the other sidewall, and said end portions are biased toward each other to overlap each other and engage said holding member and are also resiliently separable to disengage said holding member.

4,873,742

SAFETY TIE DOWN BAR HAND GRIP SYSTEM

Raymond J. Dillon, 13181 Highland Rd., Highland, Md. 20777

Filed Jul. 22, 1988, Ser. No. 223,019

Int. Cl.[4] B25G *1/06, 3/02*

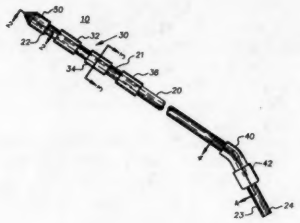
U.S. Cl. 16—111 R **14 Claims**

1. A safety tie-down bar hand grip system for use with a ratcheting tightening device, comprising:

a handle member extending in a direction defining a longitudianl axis and having at least one ratchet end section;

hand hold means encompassing discrete portions of said tubular handle member for providing a gripping surface on said handle member, said hand hold means including

(1) a plurality of annular hand grip members in longitudinally displaced relationship each with respect to the other, and (2) at least one ratchet stop member positionally located on said ratchet end section, said ratchet stop member being formed by a cylindrical wall of predetermined diameter extending between first and second open ends and being positionally located by said first end being



longitudinally displaced a predetermined distance from said hand grip members, said second end of said ratchet stop member includes an annular rim portion having a diameter larger than said diameter of said cylindrical wall, said annular rim portion being formed by a portion of said cylindrical wall being folded back upon itself; and,

an end cap member releasably coupled to an end of said handle member.

4,873,743

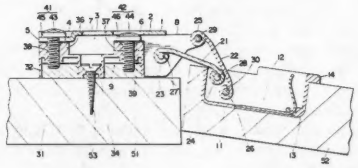
HINGE

Hiroaki Toyama, Yamanashi, Japan, assignor to Kabushiki Kaisha Murakoshi Seiko, Tokyo, Japan

Filed Dec. 29, 1988, Ser. No. 291,521

Int. Cl.[4] E05F *1/14*

U.S. Cl. 16—237 **2 Claims**



1. In a hinge comprising a base having a front portion and a rear portion, a pivotable member connected to the front portion of the base so that the pivotable member can be turned so as to be opened and closed , and a mounting member having an upper portion with front and rear sections which is formed so that the base can be secured thereto, and which is adapted to be attached to an object article, the improvement characterized in that said base consists of an upper wall having a front end and a rear end and upper and lower sides and side wall so as to have a substantially U-shaped cross section and so that the base can be fitted over the mounting member, said upper wall is provided with a longitudinally extending recess having a width and being opened at the rear end thereof and an opening having a width and being located in front of this recess, said side walls are provided with locking members in the portions thereof which are in the vicinity of the opening in the upper wall, said locking members having upper sides, rear and front screws having heads with upper and lower sides and diameters which are larger than the width of the recess and the opening in the upper wall of the base, the heads of the screws are engaged with the rear and front sections of the upper portion of the mounting member, said rear screw is engaged with the recess in the upper wall of the base with the head thereof positioned above the recess, to render the base longitudinally slidable, and said head of the front screw is located below the upper wall of said base and opposite from the lower side of said upper wall to the opening in the upper wall of the base and engaged at least from the upper side with the upper sides of the locking members on both side walls of the base to keep the base longitudinally slidable.

4,873,744

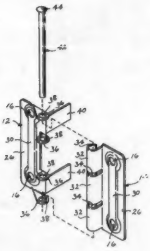
DOOR HINGE

Leonard E. Johnson, Jr., Elkhart, Ind., assignor to L. E. Johnson Products, Inc., Elkhart, Ind.

Filed Mar. 14, 1988, Ser. No. 167,699

Int. Cl.[4] E05D *11/04*

U.S. Cl. 16—247 **6 Claims**



1. A door hinge adapted to pivotally secure a door to a member, said hinge comprising first and second hinge plates adapted to be secured to said door and member respectively, one of said first and second hinge plates including only parallel spaced apart tab parts each having an opening aligned with a said opening in another tab part, the other of said first and second hinge plates including only spaced apart knuckle parts each having an opening aligned with said opening in another knuckle part, each knuckle part position between adjacent pairs of tab parts with said openings in the tab parts and knuckle parts being aligned, a pin extending through said aligned openings, two of said tab parts supportingly engaging two of said knuckle parts when said first and second hinge plates are secured to said door and member.

4,873,745

UNHINGEABLE AND CONCEALED HINGE FOR SWITCHING BOXES

Dieter Ramsauer, Am Neuhauskothen 20, D-5620, Velbert 11, Fed. Rep. of Germany

Filed Jan. 11, 1988, Ser. No. 142,376

Claims priority, application Fed. Rep. of Germany, Jan. 9, 1987, 8700368

Int. Cl.[4] E05D *7/10*

U.S. Cl. 16—258 **13 Claims**

1. In combination, a concealed hinge and door assembly for switching boxes comprising:

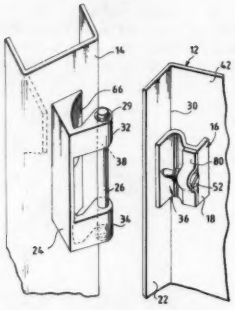
a door leaf with an inner surface and an edge section with an inner surface, the inner surfaces of the door leaf and the edge section of the door leaf forming a corner area;

a first hinge part attached to the inner surface of the door leaf;

a second hinge part surrounding the first hinge part in a shape of a U and connectable with a frame limb of the box, said second hinge part having U-limbs each with an end having a bearing eye;

a bearing bolt for effecting an articulated connection of the hinge parts, the first hinge part having a bearing block with a U-shaped cross-section forming a bearing eye which accommodates the bearing bolt, the bearing block

being fixed in the corner area of the edge section of the door leaf and having, over an open end of the U-shaped cross-section, a movable clamping arrangement for clamping the bearing bolt in the U-shaped cross-section, said bearing bolt extending an entire distance between the bearing eyes of the ends of the U-limbs of the second hinge part, said clamping arrangement including an elongated clamping member having a portion movable in a longitudinal direction into and out of said bearing eye of said first hinge part; and



means for guiding said clamping member longitudinally towards and away from said bearing eye of said first hinge part, said guiding means including a bent limb with a bend at which extends a surface in said longitudinal direction from said open end and along which said clamping member moves longitudinally, said bent limb being integrally formed with said bearing block.

4,873,746

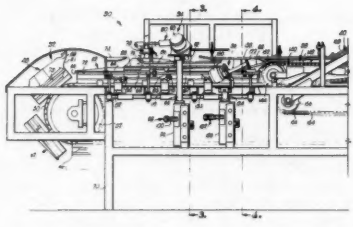
METHOD AND APPARATUS FOR REMOVING BREAST MEAT FROM POULTRY CARCASS

Donald J. Scheier, Kansas City, Mo., and Jack L. Hathorn, Springdale, Ark., assignors to Simon-Johnson Company, Kansas City, Kans.

Division of Ser. No. 147,703, Jan. 25, 1988, Pat. No. 4,827,570. This application Jan. 23, 1989, Ser. No. 300,773

Int. Cl.[4] A22C *21/00*

U.S. Cl. 17—11 **19 Claims**



1. In poultry processing apparatus for partially severing the joint between the wings and the front half of a poultry carcass for subsequent pulling of the wings and breast meat connected thereto away from the carcass, said apparatus including means for conveying the carcass along a path of travel and a pair of cutting means for partially severing the joints between each wing and the carcass, the improvement of which comprises:

means mounting said cutting means for shifting movement toward an operative position in front of the joints relative to said path of travel of the carcass and a non-operative position spaced away from and laterally aside of the path of travel of said carcass; and

means for moving said cutting means toward and away from said operative position in timed, coordinated relationship to the movement of said poultry carcass along said path of travel.

4,873,747

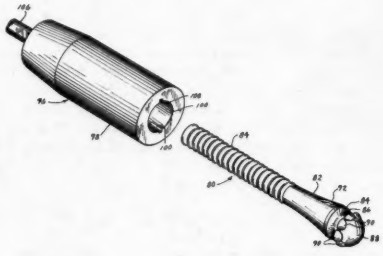
APPARATUS AND METHOD FOR MOUNTING A RESILIENT FINGER TO A POULTRY PLUCKING APPARATUS OR THE LIKE

Larry S. Dewberry, Marietta, Ga., and Richard H. Schlipp, Delafield, Wis., assignors to Waukesha Rubber Company, Inc., Waukesha, Wis.

Continuation-in-part of Ser. No. 153,994, Feb. 9, 1988, Pat. No. 4,799,293. This application Nov. 17, 1988, Ser. No. 272,762

Int. Cl.[4] A22C *21/02*

U.S. Cl. 17—11.1 R **12 Claims**



1. An assembly for use in a poultry processing apparatus or the like, comprising:

a movable member including one or more openings extending between an inner and an outer surface;

one or more fingers adapted for mounting in said one or more openings, each said finger comprising:

a shank terminating in a shoulder adapted for placement adjacent the outer surface of said movable member and having a transverse dimension greater than that of said opening;

a neck provided against said shoulder and adapted for placement within said opening and having a reduced transverse dimension relative to said shoulder;

a head provided adjacent said neck and having a base portion, wherein said base portion is provided with a series of spaced resilient protrusions about its periphery providing a transverse dimension to said base portion greater than that of said opening, said head being adapted for insertion through said opening for mounting said finger to said movable member, whereby each said protrusion deforms during insertion so as to allow said head to pass through said opening, said protrusions providing a lower surface adapted to engage the area of said movable member adjacent said opening after insertion of said finger head therethrough and return of said protrusions to their undeformed condition, for retaining said finger on said movable member; and

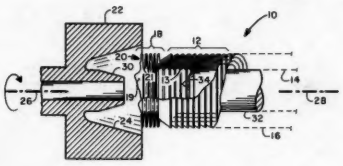
means for accommodating passage of said head through said opening in said movable member by providing deformation of said base portion of said head as it passes through said opening and thereafter allowing said base portion of said head to return to its undeformed condition for securing said finger to said movable member by positioning of said finger head on one side of said movable member and said finger shoulder on the other side of said movable member.

4,873,748

BURNISHED END SHIRRED CASING STICK, METHOD AND APPARATUS

John J. Evyan, Blytheville, Ark., and Orville D. Booth, Louden, Tenn., assignors to Viskase Corporation, Chicago, Ill.

Filed Aug. 8, 1988, Ser. No. 229,661
Int. Cl.[4] A22C *13/02*
U.S. Cl. 17—49 **24 Claims**



1. A method of forming an end face of a shirred casing stick to a desired profile comprising the steps of:

(a) providing a shirred stick composed of generally conical pleats of shirred cellulosic casing nested tightly together, the pleat inner folds defining a shirred stick axial bore opening through said end face;

(b) positioning a tool surface spaced from and in axial alignment with said end face, the tool surface being a negative to the desired profile and including a central pilot insertable into the stick bore;

(c) moving said tool surface and stick axially together thereby introducing said pilot into said bore and pressing said tool surface against said end face;

(d) spinning the tool surface and pilot relative to said stick in one direction about the longitudinal axis of the stick bore while maintaining a pressing relationship between the tool surface and said end face sufficient for both burnishing said end face to a profile which is substantially a positive reproduction of said tool surface and burnishing said pleat inner folds adjacent the opening of said bore through said end face; and

(e) continuing said spinning while axially separating the tool surface and stick.

4,873,749

METHOD AND APPARATUS FOR SUPPORTING ANIMAL CARCASSES AND PULLING HIDES THEREFROM

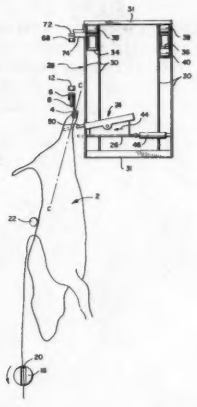
William F. Couture, Amarillo, Tex., assignor to IBP, Inc., Dakota City, Nebr.

Filed Jan. 15, 1988, Ser. No. 144,009
Int. Cl.[4] A22C *25/02*; A22B *5/16*
U.S. Cl. 17—50 **20 Claims**

1. Apparatus for holding the legs of an animal carcass while a hide pulling machine pulls the hide of the carcass toward and over the head of the carcass, comprising,

means for suspending a carcass with its head hanging downwardly,

two leg gripping assemblies positioned near said suspending means for gripping the legs of a carcass on the suspending means to hold the carcass against forces imposed on the carcass when the hide is pulled downwardly toward the head of the carcass, each said leg gripping assembly including a pair of jaws which are relatively movable from an open position to a closed position where they define a leg receiving space and are operable to grip a leg of a carcass therebetween, each of said leg gripping assemblies while its jaws are in said open position being spaced apart a distance which permits the entry thereinto and exit therefrom of a leg of a carcass, and



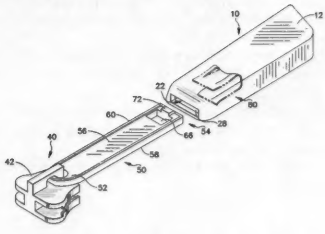
jaw actuator means for moving the jaws between said open and closed positions.

4,873,750

ATTACHMENT FOR SLIDE FASTENER SLIDER PULL TAB

Richard J. Tracy, 1002 Forest Dr., Elgin, Ill. 60123

Filed Jan. 13, 1988, Ser. No. 143,524
Int. Cl.[4] A44B *12/26*
U.S. Cl. 24—429 **9 Claims**



1. An attachment for the pull tab of a slide fastener slider for ornamentation and for enhancing the operation of the slider, said attachment comprising:

a body of soft, tough, very flexible, very tactile elastomeric material defining a channel for receiving the pull tab; said channel having an entry orifice at one end for entry of the pull tab; and

locking means in said channel and attached to said body for locking the inserted pull tab in said channel; said locking means being of substantially harder and stiffer material than said body; said locking means comprising a spring metal clip comprising:

a tongue support side;

a tab restraining side;

resilient connecting means for connecting and maintaining said support side and said restraining side spaced in opposition across said channel; and

a locking tongue having one end connected to said tongue support side and projecting into said channel toward said restraining side in a direction away from said entry orifice and terminating in an engaging end for engaging the sur-

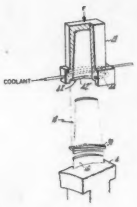
face of the inserted pull tab and thereby locking the inserted pull tab in said channel.

4,873,751

FABRICATION OR REPAIR TECHNIQUE FOR INTEGRALLY BLADED ROTOR ASSEMBLY

Raymond M. Walker, Port St. Lucie; Donald P. Achor, Stuart; Robert W. Baumgarten, Lake Park, and Ralph B. Bogard, North Palm Beach, all of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 27, 1988, Ser. No. 289,868
Int. Cl.[4] B21K *3/04*; B23P *15/02*
U.S. Cl. 29—156.8 B 3 Claims



1. A method for replacing a blade on an integrally bladed rotor, which comprises a disk having a plurality of integral blades projecting from the rim of the disk, including the steps of:

(a) removing a preexisting blade, leaving a stub, a portion of said preexisting blade, projecting from the disk rim, said blade stub having a face which constitutes a surface to which a replacement blade will be bonded;

(b) positioning a replacement blade adjacent to said stub, said replacement blade having a circumferential collar about its periphery adjacent the proposed bond with the adjacent surfaces of said stub and said replacement comprising an intended bond;

(c) applying a force between said stub and said replacement blade, with said force being applied to the replacement blade through said collar;

(d) locally heating said intended bond, between said stud and said replacement blade, to a temperature which causes softening, metal flow and bonding;

(e) removing said collar from said replacement blade by machining.

4,873,752

MANUFACTURING METHOD OF THE GAS-FLOW VALVE NOZZLE OF A LIGHTER

Yoon-Gi Suck, 1092-35, Daerim 2dong Youngdeungpo-ku, Seoul, Rep. of Korea (150)

Filed Feb. 16, 1988, Ser. No. 156,350
Claims priority, application Rep. of Korea, Apr. 13, 1987, 87-3518
Int. Cl.[4] B21K *21/08*
U.S. Cl. 29—157 C 6 Claims

1. A method of manufacturing a gas-flow valve nozzle, comprising the steps of:

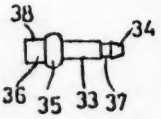
(a) drawing a segment of tubular bar material to a location above a space between first and second dies;

(b) cutting a segment of the bar material to a length substantially the same as the distance between the first and second dies, and urging the cut portion of bar material into the space between the first and second dies so that one end of the segment is registered with a first hole in the first die, and the other end of the bar material is in registration with a second hole in the second die;

(c) moving the first die relatively toward the second die so that ends of the segment of bar material enter the respective first and second holes with which they are registered, wherein an end of the segment entering the second hole in the second die is compressed and tapered by an inner wall defining the second hole;

(d) urging the segment of bar material out of the first hole in the first die some measure so that an annular protrusion is formed on the segment as the segment plastically deforms into a narrow space maintained between the first and second die;

(e) retaining the segment of bar material in the second hole while the first die is withdrawn away from the second die so that the end of the segment of bar material received within the first hole is retracted therefrom, moving the first die so that the end of the segment of bar material previously received within the first hole comes into registration with a third hole, having a diameter greater than that of the end of the segment of bar material, formed in the first die, closing the first die toward the second die so that the end of the segment of bar material enters the third hole, and expanding the end of the segment of bar material received within the third hole until its diameter achieves that of the third hole;



(f) withdrawing the first die away from the second die so that the segment of bar material is retracted from the third hole, and ejecting the segment of bar material from the second hole in the second die; and

(g) machining the segment of bar material processed in accordance with steps (a)-(f) to render the segment a finished gas-flow nozzle.

4,873,753

CONTROL SYSTEM FOR A ROTATION STATION FOR REMOTELY INSTALLING A MECHANICAL TUBE PLUG

Eric A. Kiesche, Ringgold, Ga., and Samuel B. Crabtree, Chattanooga, Tenn., assignors to Combustion Engineering, Inc., Windsor, Conn.

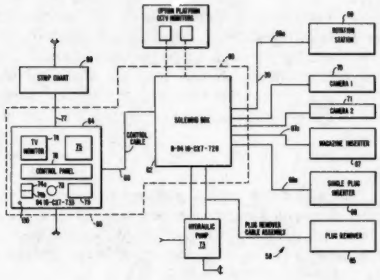
Filed Feb. 1, 1988, Ser. No. 151,115
Int. Cl.[4] B23P *7/00*
U.S. Cl. 29—157.3 R 16 Claims

1. In an apparatus for installing a mechanical tube plug used to seal a heat exchange tube of the type in a nuclear facility and comprising means for rolling said mechanical tube plug and providing a signal indication of torque while rolling, comprising:

a controller console having a plurality of switches and indicators for providing a rotation control signal for controlling rotation of said rolling means, said controller located at a point which is relatively safe and remote from a potentially unsafe site of said rolling means; and

a solenoid assembly located proximate to said site of rolling in said potentially unsafe area and in circuit with said controller, said solenoid receiving said rotation control signal and including circuit means for receiving said torque indication signal, said solenoid assembly including means for setting a predetermined torque, in response to a

signal input at said control console, said circuit means operating to terminate said rotation control signal and



disable said rolling means when said predetermined torque limit is reached.

4,873,754

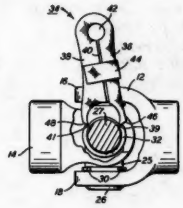
TOOL FOR REMOVING SNAP RINGS

Vernon E. Gleasman, 11 Pondview Dr., Pittsford, N.Y. 14534

Filed Aug. 12, 1988, Ser. No. 231,380

Int. Cl.[4] B23P *19/04*

U.S. Cl. 29—229 **6 Claims**



1. An articulated, self-aligning tool for removing radial retaining rings from grooved surfaces, said tool comprising:

(a) two resilient, integral prongs adapted to be moved from each other by the application of force, said prongs being substantially separated from each other by an orifice and a slot appearing therebetween, said slot communicating with said orifice, wherein:

1. each of said prongs is comprised of an inner edge, an outer edge, and a pointed end forming an acute angle with said inner edge and extending outwardly from said inner edge; and

(b) means for maintaining said prongs in parallel, in-line relation to each other.

4,873,755

SWAGING TOOL HAVING INDICATING MEANS

Lonnie E. Johnston, Bedford, Ohio, assignor to Crawford Fitting Company, Solon, Ohio

Filed May 25, 1988, Ser. No. 198,775

Int. Cl.[4] B23P *19/06;* **B23Q** *15/14*

U.S. Cl. 29—237 **25 Claims**

1. A device for swaging a ferrule onto the periphery of a cylindrical member comprising:

a piston mounted for reciprocation within a body;

an anvil member drivingly connected to said piston and having a recess in one end to receive the end of the cylindrical member;

camming means associated with said anvil member for camming a ferrule carried on the end of the cylindrical member into tight peripheral engagement therewith; and,

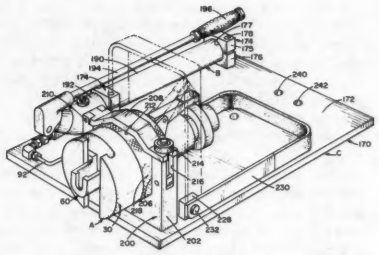
gauge means associated with said camming means for measuring the movement of the camming means relative to the body, said gauge means comprising:

an articulated signal member, comprising:

a first arm,

a second arm which is secured to one end of said first arm and is selectively pivotable thereabout,

a means for urging said second arm to one end position in relation to said first arm, said means for urging being



secured to at least one of said first arm and said second arm and being in operative connection with the other of said first arm and said second arm,

a biasing means for moving said signal member from a first to a second position, and

a means for holding said signal member in said first position until a predetermined amount of relative movement has taken place between said camming means and said body at which time said signal member is caused to move suddenly to said second position under the action of said biasing means.

4,873,756

MACHINE TOOL

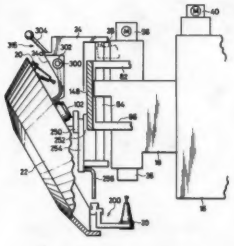
Hisaaki Yamane, and Noboru Hirose, both of Aichi, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jan. 30, 1987, Ser. No. 8,654

Claims priority, application Japan, Feb. 5, 1986, 61-15270[U]; Feb. 7, 1986, 61-26477; Feb. 7, 1986, 61-16987[U]

Int. Cl.[4] B23Q *3/157*

U.S. Cl. 29—568 **12 Claims**



1. A machine tool for machining a workpiece, the machine tool of the type having a main spindle head rotatably supporting a main spindle with a tool mount at one end, the spindle head being reciprocal relative to the machine tool frame in the axial direction of the main spindle, the machine tool further comprising:

a tool holding member installed in the tool mount of said main spindle;

automatic means for changing a tool held in said tool holding member during "double action" reciprocal tool-changing movement of said spindle head, said automatic means including:

a. a tool support carried on said frame and movable in the axial direction of said main spindle independently of said main spindle;

b. a tool magazine rotatably supported on, and axially movable with, said tool support, said magazine having a plurality of tool holders each capable of detachably holding a tool, and spaced about the magazine periphery, said magazine for indexing a selected tool holder into and out of axial alignment with said main spindle;

c. a first cam-and-crank means interconnecting said main spindle head, said frame, and said tool support for moving said tool support together with said spindle head a predetermined distance during the "double action" movement of said main spindle head relative to said frame, the tool being held in said main spindle also being engaged to be held by one of said plurality of tool holders of said tool magazine during movement in said predetermined distance, said first cam-and-crank means also for moving said tool support and said spindle head away from each other by a predetermined distance during the "double action" movement;

d. a second cam-and-crank means interconnecting said main spindle head and said frame for causing said tool holding member to release said tool from said tool holding member during a preselected portion of said "double action" movement; and

e. means for preventing movement of said tool support below a fixed axial location, said spindle head being axially movable below said fixed location for performing machining operations.

4,873,757

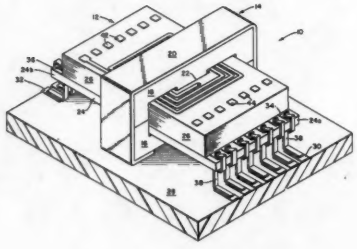
METHOD OF MAKING A MULTILAYER ELECTRICAL COIL

K. Barry A. Williams, Duxbury, Mass., assignor to The Foxboro Company, Foxboro, Mass.

Division of Ser. No. 70,640, Jul. 8, 1987, which is a continuation of Ser. No. 767,327, Aug. 21, 1985. This application Jun. 27, 1988, Ser. No. 212,143

Int. Cl.[4] H01F *7/06*

U.S. Cl. 29—602.1 **6 Claims**



1. A thin film additive method of fabricating a multi-planar-coil winding for an inductive component, comprising the steps of

patterning a first insulating film layer with a continuous spiral planar channel, and a plurality of outer apertures outside said spiral, the inner end of said spiral channel terminating at a first one of a predetermined plurality of inner locations distributed about a central section of said layer, the outer end of said spiral channel terminating at a first one of said outer apertures,

plating the channel and apertures of said first layer full of conductive metal to form a first coil,

bonding a second thin film insulating layer over said first layer,

forming in said second insulating layer, a plurality of outer apertures in registration with the outer apertures of the first insulating layer, and a single inner aperture at said first location in registration with the inner end of the conductive spiral defined in said first insulating layer,

plating the apertures in said second layer full of conductive metal,

bonding a third thin film insulating layer over said second layer,

patterning said third insulating layer with a second planar spiral channel having an inner end terminating in registration with said inner aperture in said second insulating layer and a plurality of out apertures in registration with the outer apertures in said first and second insulating layers, the outer end of said spiral channel terminating at a second one of said outer apertures, and

plating said apertures and channel in said third layer full of conductive metal to form a second coil,

whereby, a monolithic thin film multi-planar-coil winding is formed with the outer ends of each planar coil being connected to solid metal plated posts extending through the layers.

4,873,758

METHOD OF MAKING A THERMOMETER PROBE

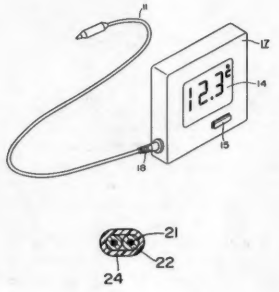
Yoshihisa Masuo, Shiga, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Division of Ser. No. 914,254, Oct. 2, 1986, abandoned. This application Jun. 2, 1988, Ser. No. 201,459

Claims priority, application Japan, Oct. 2, 1985, 60-149964

Int. Cl.[4] H01C *17/02*

U.S. Cl. 29—612 **5 Claims**



1. A method of producing a thermometer probe, comprising the steps of:

providing at least a pair of leads enclosed within an open-ended sheath;

exposing the pair of leads by axially compressing the sheath;

cutting an exposed portion on one of the leads;

connecting the exposed portion of the cut lead to one end of a temperature sensing element;

connecting an exposed portion of the uncut lead to an opposing end of the temperature sensing element;

soldering the exposed portions of the leads to the corresponding ends of the temperature sensing element;

pulling back the sheath to its original position;

enclosing the leads and temperature sensing element with the sheath; and thereafter

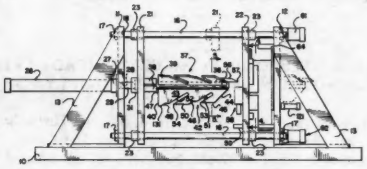
welding the open end portion of the sheath closed.

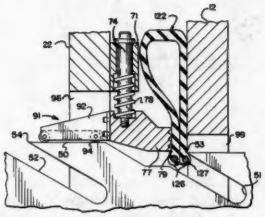
4,873,759

TIRE DEBEADING MACHINE

Elsward K. Burch, Northbrook, Ill., assignor to Nu-Tech Systems, Inc., Rosemont, Ill.

Filed May 25, 1988, Ser. No. 198,218
Int. Cl.[4] B23P *19/00*
U.S. Cl. 29—700 20 Claims





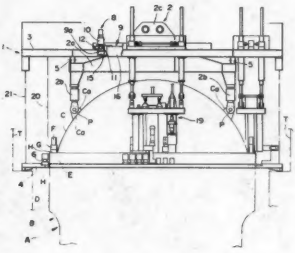
1. Apparatus for operating on tires such as automotive tires, each of said tires having first and second annular side walls, bead wires and a center circular tire opening, said tire opening having a tire axis at substantially the center thereof and extending perpendicularly to said tire opening, said apparatus comprising first and second clamp means positioned adjacent one another and adapted to receive a tire therebetween, said clamp means having clamp openings therein which are substantially concentric with said tire opening of a tire between said clamp means, first power means for moving said first and second clamp means toward each other and thereby clamping the side walls of the tire therebetween, a harpoon movable on a line of movement which is generally parallel with said tire axis, second power means for moving said harpoon along said line of movement, movement of said harpoon in said forward direction causing said harpoon to move through said clamp openings and said tire opening, said harpoon having means thereon for engaging a tire between said first and second clamp means and moving the tire to substantially center said tire opening with said clamp openings during said movement of said harpoon, means for actuating said first power means to move said first and second clamp means to clamp said side walls after a said tire opening has been substantially centered, and said harpoon further having at least one barb formed thereon, and said barb engaging and pulling said bead wires from the carcass of the tire after said side walls are clamped by said clamp means.

4,873,760

VESSEL LID MOUNTING AND DEMOUNTING APPARATUS

Naoto Watanabe, Omiya; Akira Tanaka; Takayuki Matsumoto, both of Yokohama; Yutaka Ohmura, Yokohama, and Hisao Kojima, Yokohama, all of Japan, assignors to Ishikawajima-Harima Heavy Industries Co., Ltd., Tokyo, Japan

Filed Dec. 29, 1987, Ser. No. 139,270
Claims priority, application Japan, Dec. 29, 1986, 61-311168; Jan. 10, 1987, 62-3848; Jan. 10, 1987, 62-3849
Int. Cl.[4] B23P *21/00, 19/04;* G21C *19/00*
U.S. Cl. 29—714 19 Claims



1. An apparatus for mounting and demounting a lid of a vessel on and from a body thereof, said lid and said body having their respective ring-like end flanges fastened to each other by means of a plurality of stud bolt and nut assemblies arranged in circumferentially spaced relation on a pitch circle concentric to a center of said lid, each of said stud bolt and nut assemblies including a stud bolt having an axis thereof extending vertically, and at least one nut threadedly engageable with the stud bolt, said apparatus comprising:

a sling to be fixed to said lid;

a turntable supported on said sling for turning movement in a horizontal plane relative to said sling about a vertical axis passing through a center of said pitch circle;

drive means mounted between said sling and said turntable for turning the same about said vertical axis;

a plurality of operating units supported by said turntable and arranged in circumferentially spaced relation on a circle concentric to said vertical axis, which circle has a diameter equal to that of said pitch circle, each of said operating units including nut transporting means for transporting the nuts to and from the respective stud bolts, and stud bolt attaching and detaching means for attaching and detaching the stud bolts to and from said end flange of said body of said vessel; and

positioning means for moving said turntable in the horizontal plane relatively to said sling so as to bring said operating units into vertical alignment with the stud bolts.

4,873,761

INSERTION/EXTRACTION TOOL

Iosif Korsunsky, Harrisburg; Gerald L. Foreman, and Steven P. Bateman, both of Hummelstown, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 30, 1988, Ser. No. 238,636
Int. Cl.[4] H05K *13/04*
U.S. Cl. 29—741 12 Claims

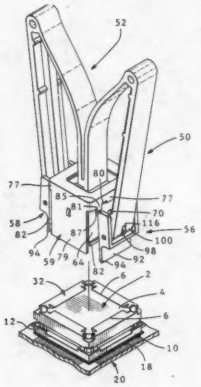
1. A tool for manipulating a chip carrier socket assembly having a chip carrier and a chip carrier socket, the tool comprising:

handle means;

engagement means for engaging the chip carrier and the chip carrier socket, the engagement means provided proximate the chip carrier and the chip carrier socket, and

being movable between an open and a closed position, thereby allowing the engagement means to cooperate with the chip carrier socket assembly;

frame means which are movable relative to the handle means, the frame means provided adjacent the engagement means, the movable frame means being movable between a first position, in which the chip carrier will be inserted into the chip carrier socket, and a second position, in which the chip carrier will be extracted from the chip carrier socket;



a first camming means, provided on the frame means, the first means cooperates with the engagement means when the frame means is provided in the first position, such that as the handle means are operated, the tool inserts the chip carrier in the chip carrier socket; and

a second camming means, provided on the frame means, the second means cooperates with the engagement means when the frame means is in the second position, such that as the handle means are operated, the tool extracts the chip carrier from the chip carrier socket.

4,873,762

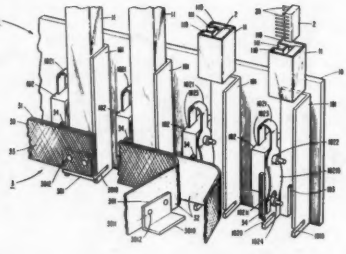
COMPONENT INSERTION MACHINE APPARATUS

William A. Elliott, Reynoldsburg; Richard A. Greene, Pickerington; Robert P. Kennedy, Columbus; Robert P. Poe, Jr., Columbus, and William H. Steece, Columbus, all of Ohio, assignors to American Telephone and Telegraph Company, AT&T-Technologies Inc., Berkeley Heights, N.J.

Division of Ser. No. 190,976, May 6, 1988, Pat. No. 4,831,696. This application Oct. 31, 1988, Ser. No. 265,378

Int. Cl.[4] B23P *19/00;* **B23Q** *7/10;* **B65H** *31/20;* **H05K** *3/30*

U.S. Cl. 29—809 **5 Claims**



1. A component insertion machine having apparatus for loading components from component magazines into the component insertion machine comprising

means having adhesive members for releasably mounting said means on the component loading apparatus and having a plurality of component retention members each located on said means to correspond with ones of the component magazines for retaining components in the component magazines and removable after installation of the component loading apparatus on the component insertion machine to disengage each component retention member from said component magazines.

4,873,763

METHOD FOR OBTAINING ELECTRICAL EARTH CONNECTION DEVICE, PARTICULARLY FOR VEHICLES

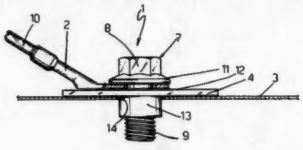
Piero Volonté, and Matteo Piccitiello, both of Turin, both of Italy, assignors to Fiat Auto S.p.A., Turin, Italy

Continuation of Ser. No. 97,458, Sep. 15, 1987, abandoned. This application Nov. 1, 1988, Ser. No. 266,347

Claims priority, application Italy, Sep. 16, 1988, 53831/86[U]

Int. Cl.[4] H01R *43/00*

U.S. Cl. 29—825 **4 Claims**



1. A method for obtaining an electrical earth connection device for vehicles, comprising the steps of:

(a) providing a metal plate for having a threaded seat (6), and a screw (7) having a threaded shank (9) and a head (8) provided with an annular flange (11);

(b) tightening the screw (7) with a predetermined torque wrench setting in order to abut with perfect adherence the lower surface of the flange (11) against the upper surface of the plate (4) in th area surrounding said seat (6);

(c) affixing the assembly so formed to a portion (3) of a vehicle body and then painting the vehicle body and the assembly so formed by immersion in a painting bath; and

(d) at least partially unscrewing the screw (7) from the seat (6) after painting and mounting a cable terminal (2) on the shank (9), and thereafter tightening the screw (7) into the seat (6) until the cable terminal (2) is clamped between the plate (4) and the flange (11).

4,873,764

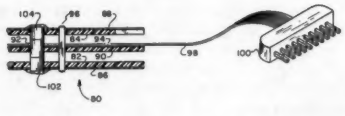
COMPONENT MOUNTING PROCESS FOR PRINTED CIRCUIT BOARDS

Frank W. Grimm, Alsip, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Division of Ser. No. 137,496, Dec. 23, 1987. This application Oct. 21, 1988, Ser. No. 260,852

Int. Cl.[4] H05K *3/36*

U.S. Cl. 29—830 **5 Claims**



1. For use in the manufacture of a layered printed circuit

board assembly having first and second layers with electrically conductive patterns thereon, a process for through-mounting in said assembly a surface-mount device having an electrically conductive cap at each end, comprising:

providing aligned holes in said first and second layers adjoining said conductive patterns;

providing an inner layer between said first and second layers and forming said layer of plastic tape inherently compliant and yielding for receiving said surface-mount device;

coating said tape with an easily performable metal layer providing electrical shielding between said layers;

inserting said device through said aligned holes and said material;

electrically and mechanically connecting at least one of said end caps of said surface-mount device to at least one of said conductive layers;

said inner layer, by virtue of its being inherently compliant and yielding, physically retaining said surface-mount device in place pending the electrical and mechanical connection of the electrically conductive end caps to the conductive patterns

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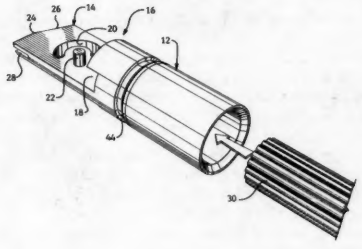
4,873,765

METHOD OF MAKING AN ELECTRICAL CONNECTOR

Walter M. Werner, Downingtown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 29, 1988, Ser. No. 238,020
Int. Cl.[4] H01R *43/00*
U.S. Cl. 29—876 **3 Claims**



1. A method for making an electrical connector comprising the steps of:

impact-extruding a slug of conductive material into a form having a cylindrical wire barrel at one end and at the other end an outwardly extending tang having a curved surface and an outwardly extending flat blade, said tang and blade overlying and spaced from each other;

shortening said tang so that only a short portion thereof overlies said blade;

coining an arcuate recess in said blade intermediate a free end thereof and said wire barrel and on a surface facing said tang;

punching a hole through said blade adjacent said recess;

shearing a corner off of said blade at the free end;

cutting a slot into said blade at the face of said free end, said slot being parallel to the plane of said blade; and

inserting an upstanding pin in said punched hole.

4,873,766

POWER SAW

Robert H. Johnston, 311 NW. 97 La., Coral Springs, Fla. 33065

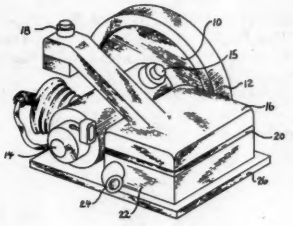
Filed Apr. 25, 1988, Ser. No. 186,024
Int. Cl.[4] B23D *45/16*
U.S. Cl. 30—166.1 **2 Claims**

1. A portable hand held power saw, comprising:

(a) an internal combustion engine having a rotational mechanical output, said engine mounted upon a rigid level platform;

(b) a gas tank for supplying fuel to said engine, said gas tank comprising a part of a handle for the holding of said power saw;

(c) a muffler and exhaust system secured intermediately between said gas tank and said rigid platform, said muffler



in fluid communication with said internal combustion engine and hot vapor generated thereby;

(d) a work element coupled to said mechanical output of said gas engine; and

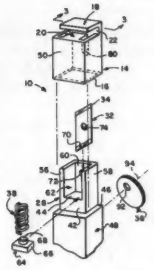
(e) mechanical clutch coupling means interposed between said output of said engine and said work element along the axis of rotation of said work element.

4,873,767

SAFETY LETTER OPENER

Hin C. Lok, 205 Spyglass La., Walnutnster, Calif. 91789-2041

Continuation-in-part of Ser. No. 124,267, Nov. 23, 1987, Pat. No. 4,803,782. This application Jun. 20, 1988, Ser. No. 209,017
Int. Cl.[4] B26B *3/00*
U.S. Cl. 30—278 **16 Claims**



1. A device for opening an envelope comprising a hollow sleeve formed by longitudinal surrounding walls extending parallel to a linear longitudinal direction of movement and which define a cavity therewith having an open end and at its opposite end a solid end wall extending perpendicular to said longitudinal direction of movement and joined to and spaced longitudinally from said longitudinal surrounding walls to define an envelope receiving slot of uniform width throughout extending perpendicular to said direction of movement, a ram extending into said open end of said sleeve whereby said sleeve and said ram are movable relative to each other in telescoping, linear reciprocal fashion in said longitudinal direction of movement, a blade mounted on said ram having at least one cutting edge directed toward said slot and disposed within said cavity and extending in said longitudinal direction of movement, means operable externally of said sleeve and said ram for adjustably limiting the extent of relative longitudinal movement

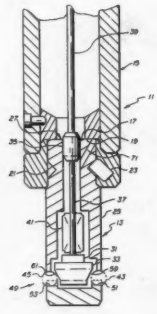
between said ram and said sleeve to control the maximum extent to which said blade is movable longitudinally into said slot and to prevent said cutting edge of said blade from extending across the entire width of said slot, and biasing means captured within said cavity and between said sleeve and said ram and disposed to urge said cutting edge of said blade away from said slot.

4,873,768

DIMENSIONING HEAD FOR PLUG GAGE

Richard G. Van Sickle, Sterling Heights, and George Bour, Lake-Holly, both of Mich., assignors to GTE Valeron Corporation, Troy, Mich.

Filed Apr. 17, 1987, Ser. No. 39,408
Int. Cl.[4] G01B *5/12*
U.S. Cl. 33—178 R 1 Claim



1. A plug gage of the type comprising a combination dimensioning head and detector,

said dimensioning head comprising an elongated cylindrically shaped housing with a longitudinal axis and having an open end and a closed end,

a gaging member mounted in said housing for movement along the longitudinal axis,

said gaging member being normally biased toward the closed end having a gage contacting portion projecting toward the open end,

a pair of balls adapted to move and contact surfaces to be dimensioned exterior to said housing,

said housing having a pair of stationary guide surfaces projecting in a direction transverse to the longitudinal axis, each guide surface forming a V-groove and being adapted to guide a respective ball,

said gaging member moveable in an axial direction and having a pair of outwardly facing planar surfaces,

said pair of outwardly facing planar surfaces converging toward the closed end at a predetermined angle to the longitudinal axis, each of said respective balls being contacted by a respective guide surface and a respective planar surface,

each V-groove presenting a pair of parallel lines of contact,

whereby said gaging members moves toward the open end as said balls are urged inwardly when contacting surfaces exterior to the housing during engaging, and wherein

said detector comprises a rod aligned along said longitudinal axis and in engagement with said gage contacting portion whereby movement of said gaging member is transmitted to said rod for detecting movement of said balls,

said detector further comprising an outer portion overlapping said cylindrically shaped elongated housing,

said cylindrically shaped elongated housing having a V-shaped circumferential groove extending entirely around the periphery,

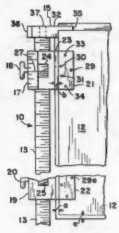
said detector including at least one set screw for urging said detector into mating relationship with said dimensioning head whereby said dimensioning head maybe adjustably rotated with respect to said detector.

4,873,769

CABINETRY INSTRUMENT

Anthony J. Casanave, P.O. Box 880, 3404 Waterview Rd., Toano, Va. 23168

Filed Aug. 1, 1988, Ser. No. 227,545
Int. Cl.[4] G01B *3/00*; F05D *11/00*
U.S. Cl. 33—194 19 Claims



1. An instrument for accurately measuring and positioning cabinet and furniture door hinges comprising:

an elongated measuring rod having a measurement scale thereon;

a door contact member transversely attached to an end of said measuring rod;

at least one sleeve member slidably disposed on said measuring rod;

means extending through a first side of said at least one sleeve member to selectively engage said measuring rod and releasably fix said sleeve member in position thereon;

a hinge template releasably connected to said sleeve member;

said hinge template including a base portion and an elongated tenon extending from said base portion;

an elongated mortise formed in a second side of said sleeve member opposite to said first side;

said mortise serving to receive said elongated tenon of said hinge template; and,

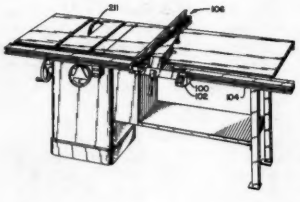
means for releasably securing said elongated tenon within said elongated mortise of said sleeve member.

4,873,770

CAPACITIVE MEASUREMENT SYSTEM

David J. Luttmer, Glenshaw; Thomas L. Panian, Allison Park; Barry D. Wixey, and Raymond L. Wilson, both of Pittsburgh, all of Pa., assignors to Delta International Machinery Corp., Pittsburgh, Pa.

Filed Aug. 19, 1988, Ser. No. 233,493
Int. Cl.[4] G01B *7/02*
U.S. Cl. 33—706 30 Claims



1. A capacitive measurement system, comprising:

(a) means for generating a plurality of waveforms;

(b) reader reference means comprising a calibrated reference member for use with a reader head in making a measurement, the calibrated reference member comprising one element of a capacitor;

(c) reader head means comprising a reader element configured to move laterally with respect to the calibrated reference member for making the measurement relative to a reference position on the reader reference means, the reader element comprising:

(i) a plurality of reader regions comprising the other element of the capacitor, the reader regions further comprising means for receiving the waveforms; and

(ii) signal input means for receiving two signals resulting from coupling of the two capacitor elements, the signal input means being isolated from the reader regions; and

(d) phase shift detection means for detecting a predetermined phase shift level between the two signals received by the signal input means when there is no lateral movement between the calibrated reference member and the reader element, for detecting a decreasing phase shift level between the two signals received by the signal input means when there is lateral movement in a first direction, and for detecting an increasing phase shift level between the two signals received by the signal input means when there is lateral movement in the opposite direction, the phase shift detection means comprising means for detecting the magnitude of the lateral movement by detecting the magnitude of the phase shift in a particular direction.

4,873,771

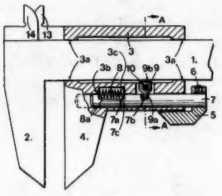
SLIDE GAUGE

Robert Wüst, Delemont, France, assignor to Schnyder & Cie, Bevilard, Switzerland

Filed Mar. 14, 1988, Ser. No. 170,682

Int. Cl.[4] G01B *5/02*

U.S. Cl. 33—802 **8 Claims**



1. slide caliper, comprising a beam with at least one measuring jaw mounted thereon, a slide sliding along the beam and provided with at least one measuring jaw, a pusher supported in the slide to be movable in two opposite measuring directions, by means of which the slide can be shifted on the beam in the two opposite directions, wherein the pusher is resiliently supported with respect to the slide in the two aforementioned directions, a spring supported under a predetermined bias between the slide and the pusher, this bias being larger than the displacement resistance of the slide on the beam, so that the spring prevents a relative displacement between the pusher and the slide during the free displacement of the slide in the two aforementioned directions, a clamping element for selectively clamping the slide to the beam and releasing the slide for movement along the beam, and means responsive to movement of the pusher relative to the slide upon the imposition on the pusher of a force greater than said bias, to move the clamping element to clamp the beam, thereby to limit the measuring force exerted by said jaws on an object being measured.

4,873,772

STEAM TREATMENT OF CROPS

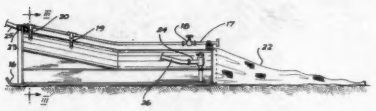
Jack Maher, deceased, late of Forbes, Australia (by Molly Veronica Maher, Robert James Maher, co-executors), assignor to Riyate Pty. Limited, Australia

Continuation-in-part of Ser. No. 583,385, Feb. 24, 1985, Pat. No. 4,604,857. This application Jun. 30, 1986, Ser. No. 880,176

Claims priority, application Australia, Feb. 25, 1983, 12434/83

Int. Cl.[4] F26B *19/00*

U.S. Cl. 34—60 **6 Claims**



1. A crop conditioner comprising an elongated treatment chamber having front and rear ends, for receiving crop to be conditioned without moving, mechanically handling or disturbing the crop, a plurality of steam outlet nozzles within the chamber near the front end thereof adapted to direct steam to the crop after entering the inlet, and means for supplying steam to the outlet nozzles.

4,873,773

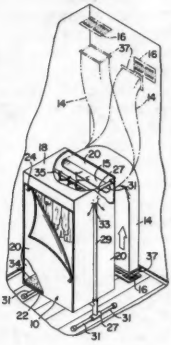
CLOTHES DRYER FOR USE WITH FORCED AIR HEATING SYSTEM

Sidney J. Canonge, Huntington Beach, Calif., assignor to William H. Takahashi, Anaheim, Calif.

Filed May 2, 1988, Ser. No. 189,021

Int. Cl.[4] F26B *19/00*

U.S. Cl. 34—90 **14 Claims**



1. A portable clothes dryer comprising:

a bag having flexible walls that have multiple minute openings therethrough for the limited outflow of air from the bag,

a hot air intake duct having one of its ends connectible to a pre-existing conventional hot air register and its other end connected to said bag for introducing pressurized hot air to the bag interior space, and

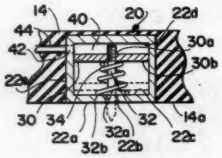
means for hanging items of clothing within the bag, said bag being fully closable so that outflow of air from the bag is substantially solely through said minute openings for limited outflow of air,

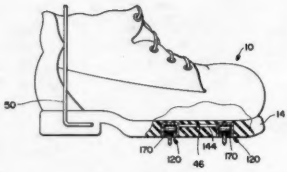
said minute openings being sized to exert a back pressure on the pressurized air within the bag whereby the bag walls are caused to balloon outwardly such that hot air within the bag is in a pressurized semi-trapped state.

4,873,774
SHOE SOLE WITH RETRACTABLE CLEATS

Alan W. Lafever, Cookeville, Tenn., assignor to Universal Plastics Incorporated, Cookeville, Tenn., a part interest

Filed Mar. 1, 1988, Ser. No. 162,588
Int. Cl.[4] A43C *15/14*; A43B *13/24*
U.S. Cl. 36—61 9 Claims





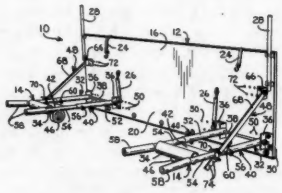
1. A shoe sole, comprising:
a sole portion for supporting the wearer's foot;
at least one chamber provided in said sole portion, said chamber having top, side and bottom walls enclosing an interior volume of said chamber, at least one opening being provided in said bottom wall;
a cleat plate provided horizontally in each said chamber and vertically movable therein, said cleat plate having at least one cleat extending from a bottom thereof in a position corresponding with said opening in said chamber bottom wall, said cleat being able to pass through said opening;
means for urging said cleat plate upwardly away from said chamber bottom wall;
a fluid communication port in each said chamber whereby fluid pressure may be communicated to said chamber; and
an inflatable member provided in each said chamber between said cleat plate and said chamber top wall, said inflatable member being in fluid communication with said fluid communication port of said chamber.

9. A shoe sole, comprising:
a sole portion for supporting the wearer's foot;
at least one chamber provided in said sole portion, said chamber having top, side and bottom walls enclosing an interior volume of said chamber, at least one opening being provided in said bottom wall;
a cleat plate provided horizontally in each said chamber and vertically movable therein, said cleat plate having at least one cleat extending from a bottom thereof in a position corresponding with said opening in said chamber bottom wall, said at least one cleat being able to pass through said opening, said at least one cleat being threadedly held in said cleat plate whereby the position of said cleat relative said cleat plate is adjustable, an upper end of said at least one cleat protruding above said cleat plate for abutting said chamber top wall to provide a positive stop limit to upward vertical excursion of said cleat plate in said chamber;
means for urging said cleat plate upwardly away from said chamber bottom wall; and
a source of fluid pressure in selective fluid communication with a portion of said chamber interior volume above said cleat plate, for selectively pressurizing said space above said cleat plate to force said cleat plate downwardly against the urging of said urging means to extend said at least one cleat plate thereof through said opening in said chamber bottom wall.

4,873,775
VEHICULAR ATTACHMENT SYSTEM FOR A SNOWPLOW OR THE LIKE

Stephen J. Richey, 5708 Raintree, Parkville, Mo. 64152

Filed Nov. 17, 1987, Ser. No. 121,517
Int. Cl.[4] E01H *5/04*
U.S. Cl. 37—231 15 Claims



1. An implement for a wheeled vehicle for allowing at least one rotatable support wheel of the vehicle to propel said implement ahead of the vehicle in the direction of travel thereof, the wheel being rotatable about an axis generally transverse to the direction of travel of the vehicle and presenting a peripheral portion located on the direction-of-travel edge of the wheel, said implement comprising:
blade means; and
engagement means coupled with said blade means for engaging the peripheral portion of the wheel for receiving substantially all of the propulsion force therefrom required for propelling said blade means ahead of the vehicle during movement thereof in the direction of travel,
said engagement means further including means for preventing the wheel from riding thereover during movement in the direction of travel,
said engagement means further including guide alignment means for maintaining alignment of the vehicle wheel with said engagement means without connection to the vehicle.

4,873,776
HINGED ILLUMINATED SIGN

Andrew B. Hoffart, Mission Viejo, Calif., assignor to American Display Inc., Rancho Santa Margarita, Calif.

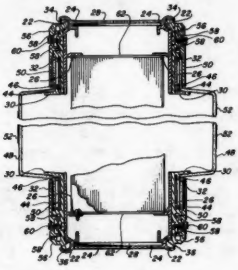
Filed Oct. 31, 1988, Ser. No. 264,801
Int. Cl.[4] G09F *13/04*
U.S. Cl. 40—572 7 Claims

1. An illuminated sign with integral hinged sides comprising:
(a) an extruded U-section shaped rectangular body having a first side and a second side and having a radial socket along an outer edge of both the first and second side, also a pair of internal recessed angle receiving grooves and a pair of inwardly depending support legs, said body formed into a rectangle having mitered corners, defining a structural frame;
(b) a plurality of angle brackets, one on each corner, so configured as to slideably engage said angle receiving grooves in said body creating a structurally reinforced corner;
(c) a pair of rectangular hinged casings, slightly smaller in girth than said body having a face recess and an outwardly extending radial protuberance along a top edge and an outwardly extending pointed lip on the remaining edges, the radial protuberance slightly smaller in diameter than

the body radial socket and pivotally positioned therein allowing the casings to be retained and hinge outwardly from the body for access inside;

(d) integral self-latching means characterized by said outwardly extended pointed lips on the perimeter of the casing, contiguously engaging the body radial socket on the edge of both the first side and the second side retaining the casings in place by frictional resistance while allowing opening thereof by utilizing a slight bending moment of the body radial socket creating a snap acting closure;

(e) a pair of translucent faces, one on each side of the sign having a peripheral flange and a raised center portion with the flange embracing the face recess of the casing, the face providing a message in the form of a design or indica on the center portion thereof visible from a distance;



(f) a pair of "F" shaped rectangular face retaining copings nested into said hinged casing joined together with attaching means each coping having a pair of inwardly depending spacer legs of a configuration that overlaps said peripheral flange of the translucent face, retaining the face between the coping and the hinged casing in a removable manner allowing the face to be replaced if damaged; and,

(g) lighting means inside the sign providing an electrically actuated light source creating the illumination necessary to make the sign visible from a distance at night and to provide a pleasing appearance through the translucent face distinctly outlining a design or indica positioned thereupon.

4,873,777

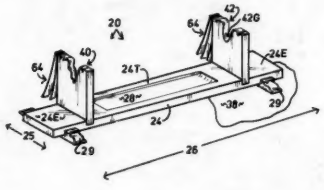
PRESS FIT GUN CRADLE FOR FIREARM MAINTENANCE AND REPAIR

Robert C. Southard, HC 32, Box 3-A, Locust Grove, Ark. 72550

Continuation-in-part of Ser. No. 158,945, Feb. 22, 1988, Pat. No. 4,807,381. This application Sep. 19, 1988, Ser. No. 246,082

Int. Cl.[4] F41C *29/00*

U.S. Cl. 42—94 **9 Claims**



1. A gun cradle for firearms for temporarily retaining said firearms without damage for maintenance, repair or adjustments, said gun cradle comprising:

a generally planar base having a top, an underside, a pair of opposed spaced-apart ends, a length, and a width, said base adapted to be disposed upon a supporting surface;

a pair of spaced-apart, parallel, generally horizontal stabilizers coupled to the underside of said base and extending generally perpendicularly relative to the length of said base for firmly and stably supporting said base upon said surface, said stabilizers having a predetermined length and said stabilizers spaced apart from one another a first preselected distance;

a pair of rigid, spaced-apart, vertical sides extending perpendicularly upwardly from said base near opposite ends thereof, each of said sides comprising a bottom secured to said base, a top, and at least one firearm-receptive groove formed in said top, said sides spaced apart from one another at a second preselected distance;

a leather strap permanently disposed upon said tops of each of said vertical sides, said strap lying within said grooves and forming a compliant, nondestructive surface to firmly brace said firearm when press-fitted into said grooves; and

a plurality of additional leather straps adapted to suitably shim at least a portion of a firearm to enable it to be compressively and snugly frictionally fitted within said grooves in cooperation with said first mentioned leather straps, said plurality of straps comprising at least one reservoir of straps pivotally secured to at least one of said vertical sides adjacent said at least one firearm-receptive groove by a fastener so that one or more of said additional straps may be rotated relative to said fastener for subsequent deployment in said groove to aid in shimming.

4,873,778

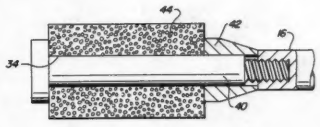
GUN BORE CLEANING APPARATUS

M. R. Stipp, P.O. Box 2613, Midland, Tex. 79702

Filed Dec. 12, 1988, Ser. No. 283,203

Int. Cl.[4] F41C *31/00*

U.S. Cl. 42—95 **10 Claims**



1. A swab assembly for connection to a cleaning rod or the like, for use with a cleaning rod or the like in cleaning the bore of a shotgun, said assembly comprising:

a spindle constructed from rigid material and a cleaning element removably mounted thereon,

said cleaning element having a cylindrical exterior surface and a central bore extending axially therethrough, said cleaning element being constructed of polyethylene closed cell foam and being of a greater diameter than the bore of said gun,

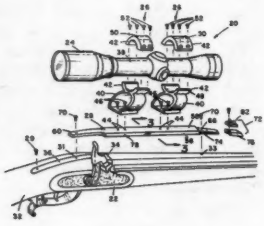
said spindle having a central cylindrical portion for receiving said cleaning element, said cylindrical portion being of a size to extend through the central bore in said cleaning element, a pair of spaced annular shoulders at opposite ends of said central portion, said shoulders being spaced apart to correspond to the axial length of said cleaning element, each of said shoulders terminating in a cylindrical guide surface extending axially in a direction away from said central position, each of said shoulders being small enough in diameter to slide axially through the bore and being smaller in diameter than said cleaning element.

4,873,779

SCOPE MOUNT BASE FOR A BLACK POWDER RIFLE

Larry J. Ellison, Sevierville, and John R. Smelcer, Dandridge, both of Tenn., assignors to Leonard G. Adams, Alcoa, Tenn., a part interest

Filed Feb. 16, 1989, Ser. No. 311,603
Int. Cl.[4] F41G *1/38*
U.S. Cl. 42—101 **13 Claims**



1. A scope mount base for a black powder rifle having a pair of factory-formed, pre-tapped openings along its length, one of the pre-tapped openings adapted to receive a screw for holding a rear sight against the rifle barrel and the other of the pre-tapped openings adapted to receive a screw for joining the rifle breech to the rifle stock, said mount base comprising:

bar means including a forward portion for attachment to the rifle barrel by means of a screw threadably received by said one pre-tapped opening and a rearward portion for attachment to the breech by means of a screw threadably received by said other pre-tapped opening; and

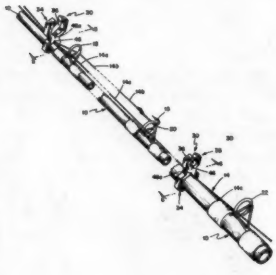
said forward and rearward portions joined to one another and providing means by which a scope can be secured to said bar means for mounting the scope upon the rifle.

4,873,780

DEVICE FOR RETAINING A FISH LINE AGAINST A TAPERED FISHING ROD

Henry J. Lancette, 2050 Delaware, Apt. 437, St. Paul, Minn. 55118

Filed Feb. 1, 1988, Ser. No. 150,983
Int. Cl.[4] A01K *87/00*
U.S. Cl. 43—25.2 **4 Claims**



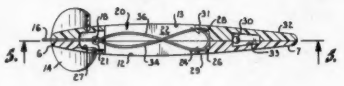
1. In combination with a tapered fishing rod having a flexible fish line extending longitudinally therealong, a plastic device retaining said fish line in a fixed relation with said fishing rod comprising a shank member and a pair of jaw members integral therewith having a lateral spacing greater than a first tapered portion of said rod and having a cross section less than a second tapered portion of said rod, said jaw members tightly engaging a third tapered portion of said rod residing between said first and second portions to retain a portion of said fish line in a fixed relation with said third rod portion, said jaw members possessing a limited degree of inherent resiliency and having a low coefficient of friction, thereby enabling said device to be smoothly slid along said tapered rod from said first portion to said third portion to cause said jaw members to tightly engage said third portion.

4,873,781

HIDDEN HOOK ARTIFICIAL LURE

Mitchell G. Bates, 908 Brooke Ct., Nixa, Mo. 65714

Filed Jul. 6, 1988, Ser. No. 215,569
Int. Cl.[4] A01K *83/00*
U.S. Cl. 43—35 **4 Claims**



1. An artificial fishing lure with hidden hooks comprising:

a body having a nose and a tail portion, and a cavity therein, and having a recess adjacent said nose portion thereof and a recess adjacent said tail portion thereof, said tail recess having abutment walls;

opposed elongated slits each positioned on an opposed side of said body medially positioned between said nose and said tail portions and extending longitudinally thereof;

a spring hook assembly formed from a single member and having a medially positioned bite portion with opposed ends respectively terminating in hook arms and hook ends;

a trigger assembly having a first eye protruding from said nose end for attachment to a fishing line and a second eye for engagement with said bite portion of said spring hook assembly;

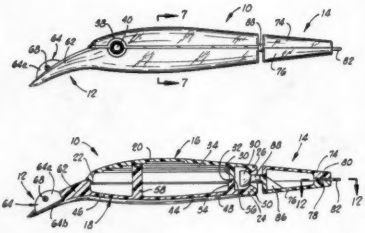
whereby said spring hook assembly is adapted to be selectively shifted between a retracted and an extended position in response to the movement of said trigger assembly, said hook ends being confined within said tail recess by said abutment walls when in said retracted position, and said hook arms and said hook ends advancing forwardly when said trigger is activated to extend outwardly through said slits.

4,873,782

SWIVEL TAIL ARTICULATED FISHING LURE

Clyde S. Gudermuth, Jr., Fort Smith, Ark., assignor to EBSCO Industries, Inc., Ala.

Filed Jul. 5, 1988, Ser. No. 215,721
Int. Cl.[4] A01K *85/00*
U.S. Cl. 43—42.15 **9 Claims**



1. A fishing lure comprising:

a hollow forward body portion having a forward end and a

rear end portion defining a opening into the interior of the forward body portion, said hollow forward body portion including:

an upper body part; and

a lower body part, each of said upper and lower body parts having a forward end and a rear end, and having a closure plate at the rear end thereof, each of said closure plates defining a semicircular opening, with the closure plate semicircular openings registering to form a substantially circular opening at the time when said upper body part and lower body part are joined along a plane extending through the longitudinal axis thereof, said closure plates each having a beveled surface thereon immediately adjacent its respective closure plate semicircular opening to define a tapered, outwardly, flaring frustoconical surface surrounding said opening and facing rearwardly;

a body tail section of generally frustoconical configuration;

a neck projecting from said tail section through the circular opening defined by said closure plates in the rear ends of said upper body part and said lower body part;

rear partition means on said upper and lower body parts spaced forwardly from, and defining with, said closure plates, a chamber in the rear end portion of said forward body portion of said lure;

a semispherical ball element secured to the neck at a location within said chamber in the rear portion of said forward body portion of the lure with the arcuate semispherical surface of said semispherical ball element facing rearwardly toward said closure plates and forming a bearing surface to permit said semispherical ball element to rotate in every direction of movement and through 360° against said closure plates to thereby permit said neck and said tail section to rotate about the projected axis of said forward body portion and to pivot in any direction with respect to said longitudinal axis; and

a diving plane subassembly secured to the forward end portion of said forward body portion and projecting forwardly and downwardly therefrom.

4,873,783

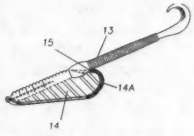
SIDE STEPPER WORMS WITH HOOK POCKET

Welbourne D. McGahee, Melbourne, Fla., and John W. Campbell, Montgomery, Ala., assignors to Loop-A-Line, Inc., Melbourne, Fla.

Filed Feb. 7, 1989, Ser. No. 307,823

Int. Cl.[4] A01K *85/00*

U.S. Cl. 43—42.24 **23 Claims**



1. A fishing lure, comprising:

a live bait emulating body including a membrane with a pocket formed therein for containing a hook that has been threaded on said body; and

said membrane dimensioned to completely enclosed said hook and the hook gap.

4,873,784

DISK SHAPED FISHING LINE BOBBER

Terry L. Petron, 3905 25th Ave., So., Minneapolis, Minn. 55406

Filed Feb. 13, 1989, Ser. No. 309,116

Int. Cl.[4] A01K *93/00*

U.S. Cl. 43—44.95 **1 Claim**

1. A bobber to be mounted on a fishing line comprising:

a pair of buoyant plate-like members in a juxtaposed operated position;

an axial rivet with the head portions larger than the shaft portion, wherein the center of said members are captured, compressed, and depressed between the heads of the rivet whereby said bobber is attached to said fishing line by

wrapping said line around said shaft positioning said line within said member's compressed region.

4,873,785

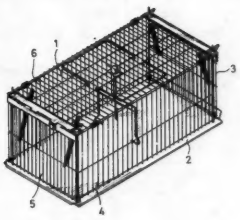
TRAP

Shun T. Lai, No. 7, Alley 73, Wan Nien Lane, Tung Ho Li, Yuan Lin Chen,, Jang-Hwa Hsien, Taiwan

Filed Mar. 13, 1989, Ser. No. 322,507

Int. Cl.[4] A01M *23/18*

U.S. Cl. 43—61 **2 Claims**



1. A trap comprising a top plate, a bottom plate, four side doors, two elongated elements and a delicate sensing means, wherein two of said side doors face each other are openable and connected to said top door by springs, each of said openable doors having a slot thereon, said sensing means comprising a block which is above said top plate and a plurality of hooks which are below said top door, said block being substantially rectangular with two small protuberances parts protruding oppositely therefrom, each of said elongated elements being substantially L-shaped with a crooked end;

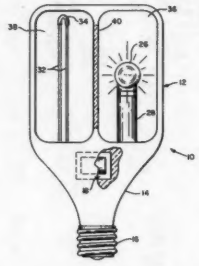
when in use, two of said openable doors being opened and held horizontally by said elongated elements which are attached to said block with said crooked end of said elongated members while an end of a straight portion of said elongated elements are inserted into said slots of said openable doors.

4,873,786

BUG WHACKER LIGHT

Nicholas N. Franco, 3380 NW. 46 Ave., Lauderdale Lakes, Fla. 33319

Filed Jul. 18, 1988, Ser. No. 220,722
Int. Cl.[4] A01M *1/04, 1/22;* F21V *33/00;* H05C *3/00*
U.S. Cl. 43—112 **5 Claims**



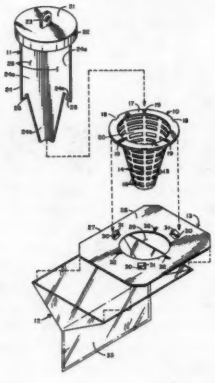
1. An insect killing light comprising:
a glass envelope having a transparent central divider wall integrally attached in said envelope defining first and second compartments having respective openings in side-by-side relation and facing in the same direction,
threaded base means for the envelope for receipt in a light bulb socket,
a high voltage circuit means in said envelope and including a pair of electrodes that are spaced apart and are fixedly secured in said envelope at one end and that extend, spaced apart, upwardly within the first compartment providing a means for killing the insects, and
an electric light bulb mounted in said second compartment for illuminating the surrounding space while also attracting insects.

4,873,787

ENTRY STRUCTURE FOR FLEXIBLE BAG TYPE INSECT TRAP

Rodney G. Schneidmiller, S. 1911 Conklin, Veradale, Wash. 99037

Filed Sep. 14, 1988, Ser. No. 244,042
Int. Cl.[4] A01M *1/10*
U.S. Cl. 43—122 **5 Claims**



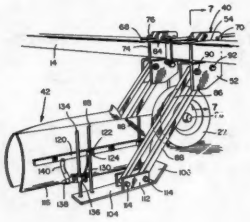
1. An entry structure for a containment type insect trap, having a flexible containment bag with an orifice defined in its top portion for passage of and interconnection with the entry structure, comprising, in combination:
a peripherally defined truncated conic entry member having an annular rim extending outwardly from the base, said annular rim having first means to releasably fasten a fastening plate adjacent thereto and second fastening means to fasten a pillar of a closing structure thereto;
a closing structure having an upper cap carried by a depending pillar defining plural elongate channels extending inwardly from its periphery, said pillar having a lower portion configured to fit within the truncated conic entry member and fastening means to cooperatively fasten with the second fastening means of the conic entryway member; and
a fastening plate, defining a medial entry orifice slidably carrying the upper portion of the closing structure pillar, said fastening plate configured to fit immediately upwardly adjacent the annular rim of the entry member and having means to releasably fasten with the first fastening means of the annular rim.

4,873,788

BRACKET ASSEMBLY AND PLANT LEAF LIFTER AND PROTECTOR

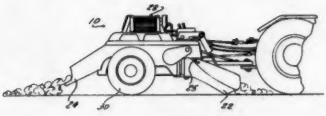
Jose A. Viramontes, Star Rte., Box 18-A, Mesilla Park, N. Mex. 88047

Filed Jun. 24, 1988, Ser. No. 211,040
Int. Cl.[4] A01G *25/00*
U.S. Cl. 47—1.7 **15 Claims**



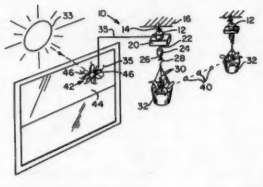
1. In combination with a tool bar for support rearwardly of a tractor having a three point hitch, said tool bar including an A-frame bracket and a pair of horizontally spaced bracket assemblies disposed on the tool bar for mounting engagement with the lower arms and upper arm of a three point hitch, bracket assemblies mounted on the tool bar in pairs with each pair of bracket assemblies supporting a plant leaf lifter and protector extending downwardly and rearwardly therefrom for movement along a path adjacent opposite surfaces of a row of plants and including a discharge nozzle for discharging liquid material onto the ground surface adjacent the plants with the plant leaf lifter and protector protecting the plants from direct contact with the discharged material, each of the bracket assemblies comprising a pair of generally parallel side plates with each of the side plates including a rearwardly opening notch of a configuration to receive the tool bar, rigid means interconnecting the side plates with the edges of the notches in the side plates engaging a substantial portion of the periphery of the tool bar, a pivotal clamp plate mounted between the side plates at the upper end of the notch and extending rearwardly into overlying relation to the tool bar, a clamp bolt extending through the clamp plate and a threaded fitting rigid with the bottom of the notch rearwardly of the tool bar whereby the bracket assemblies may be adjustably and tightly clamped to the tool bar.

4,873,789
SOIL STERILIZER
Andrew J. Plattner, 4663 Hedgewood Dr., Birmingham, Mich. 48010
Filed Jan. 20, 1987, Ser. No. 5,151
Int. Cl.[4] A01B 77/00
U.S. Cl. 47—1.42 4 Claims



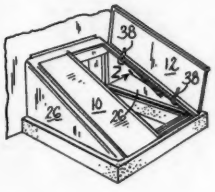
1. An apparatus for soil sterilization to control undesirable biotica resident therein, comprising in combination:
a shielded chamber with a baffled inlet and a baffled outlet;
means for generating electromagnetic energy having a frequency in the range of from 60 to 3,000,000 gigaHertz, said energy being contained within the chamber;
a conveyor means to continuously convey portions of unsterilized soil into the baffled inlet, through the chamber and out the baffled outlet, whereby the soil is exposed to the electromagnetic energy within the chamber for a sufficient duration to cause significant death and disability of the undesirable biotica resident therein;
means whereby the apparatus is mounted on wheels and may be moved across portions of a tillable field;
a scalping blade for removing soil from a tillable field to a predetermined depth for deposit on the conveyor means;
a screening device between the scalping blade and baffled inlet for selective removal of objects from the soil of a size larger than a predetermined value;
means for discharging the sterilized soil back on to the tillable field;
means for measuring the radiation level of the sterilized soil immediately prior to discharge; and
a power plant capable of powering the generating means with an output capacity of at least 300 roentgens.

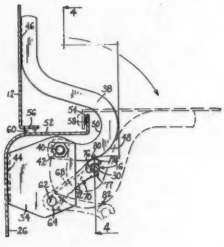
4,873,790
PLANT SPINNER
Joseph Laterza, 1456 Middle Country Rd., Centereach, N.Y. 11720
Filed Aug. 26, 1988, Ser. No. 237,279
Int. Cl.[4] A01G 9/02
U.S. Cl. 47—67 7 Claims



1. A plant spinner for plants cultivated by window light comprising:
an assembly housing for mounting on a stationary support;
an electric motor secured in said housing;
a reduction gear box secured to said motor for reduction of the speed thereof;
a swivel secured to an output shaft of the gear box and having means for connection to a potted plant to effect rotation thereof by the motor and operable to permit rotation of the potted plant relative to the output shaft for protection of said motor and said solar cell in the event of obstruction of free rotation of the potted plant; and,
a solar cell device comprising a simulated plant with a plurality of solar cells thereon at least one of which is electrically connected to the motor for supplying power thereto; and,
means for securing said simulated plant to a window pane for exposure of the solar cells to light from the sun.

4,873,791
TORQUE ROD OPERATED COUNTERBALANCING HINGE AND DOOR ASSEMBLY
Robert Lyons, Sr., Hamden, Conn., assignor to The Bilco Company, West Haven, Conn.
Filed Oct. 27, 1988, Ser. No. 263,533
Int. Cl.[4] E05F 1/10
U.S. Cl. 49—386 19 Claims





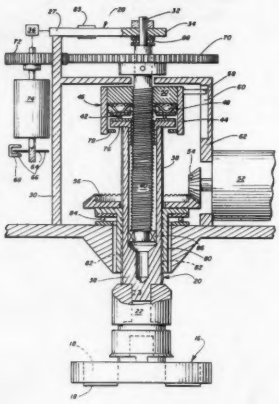
17. A counterbalancing hinge comprising:
a first hinge member;
a second hinge member hingedly connected to the first hinge member at a hinge point, said second hinge member integrally including a cam means having a cam surface formed thereon; and
a counterbalance torque means for producing a counterbalancing torque at the hinge point which is a substantially sinusoidal function of the opening angle of the hinge, said counterbalance torque means including:
a lever arm means rotatably mounted at a pivot point, said pivot point being located at a position displaced from the location of the hinge point
said lever arm means having a bearing surface for contacting the cam surface; and
a linear force producing means operatively connected between the lever arm means and the first hinge member.

4,873,792
POLISHING APPARATUS
Thomas A. Linke, Wadsworth; Issa R. Dandan, Niles; Troy W. Livingston, Northbrook, all of Ill., and Alan W. Wilkerson, Cedarburg, Wis., assignors to Buehler, Ltd., Lake Bluff, Ill.
Filed Jun. 1, 1988, Ser. No. 200,842
Int. Cl.[4] B24B 49/04
U.S. Cl. 51—165.8 21 Claims

18. In apparatus for grinding or polishing specimens comprising a vertical shaft; means for rotating said vertical shaft;

means for attaching a holder for specimens to be polished to the lower end of the vertical shaft; and means for pressing specimens carried in such an attached holder at a predetermined force against a polishing surface, the improvement comprising, in combination:

said pressing means comprising a strain gauge, said strain gauge carrying said vertical shaft at the upper end of the shaft whereby the strain gauge may emit a signal responsive to the sensed weight of the shaft and parts carried thereon; and electrically operated mechanical means for vertically advancing and retracting said shaft in a manner



responsive to signals from said strain gauge during the grinding process, said shaft including a vertical rod, and a vertical member which is relatively rotatable with respect to said vertical rod, said vertical member being in telescoping relation with said vertical rod; means for rotating said vertical member; means for causing said vertical rod and vertical member to increase or decrease its overall length as said vertical rod is rotated relative to said apparatus, said electrically operated mechanical means being adapted to rotate said vertical rod to vertically advance or retract said shaft in response to signals from said strain gauge by increasing or decreasing said overall length.

4,873,793

NUMERICALLY CONTROLLED MACHINE TOOL

Hiroaki Asano, Okazaki; Toshio Tsujiuchi, Kariya; Takao Yoneda, Nagoya; Nobuhiro Ishihara, Aichi; Toshio Maruyama, Kariya, and Norio Ohta, Okazaki, all of Japan, assignors to Toyoda-Koki Kabushiki-Kaisha, Kariya, Japan

Filed Sep. 3, 1987, Ser. No. 92,689

Claims priority, application Japan, Sep. 22, 1986, 61-224272; Sep. 22, 1986, 61-224273

Int. Cl.[4] B24B *51/00*

U.S. Cl. 51—165.71 **9 Claims**

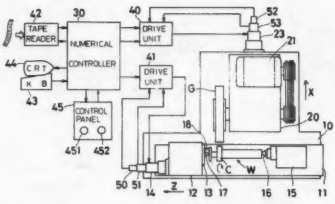
1. A numerically controlled machine tool, which has a tool feed axis servomotor, for grinding a non-circular workpiece according to profile data which define a profile generating movement of a tool along the final shape of non-circular workpiece, said numerically controlled machine tool comprising:

a numerical controller for outputting a command position signal according to execution profile data calculated from ideal profile data corresponding to an ideal final shape of said workpiece and compensated for position error due to a follow delay characteristic of said numerically controlled machine tool;

position detecting means for detecting the position of the tool feed axis servomotor, and for outputting a position feedback signal;

a follow error detecting circuit for inputting said command signal position and said position feedback signal, and for detecting a position follow error of said servomotor so as to produce an error signal corresponding to said detected position error;

a velocity compensation signal generating circuit for gener-



ating a compensation signal corresponding to a commanded velocity of said servomotor;

an adding circuit for adding said compensation signal to said signal error; and

an amplifier for driving said servomotor according to the output signal of said adding circuit.

4,873,794

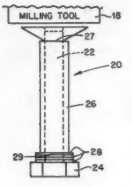
HOLDER FOR MILLING COUNTERSINK FILLER PLUGS

Jeffrey L. Shurtliff, Clinton, and Michael E. Thomas, Layton, both of Utah, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 21, 1986, Ser. No. 865,323

Int. Cl.[4] B24B *41/06*

U.S. Cl. 51—227 R **3 Claims**



1. A holder for milling a surface of a countersink filler plug, said filler plug being made of a material having a predetermined hardness and having a hole therein of a preselected diameter, and said hole having a longitudinal axis substantially perpendicular to said surface of said filler plug, said holder comprising:

means having a shank made of a material harder than said predetermined hardness of said filler plug and a base for supporting said filler plug adjacent a milling tool, said shank being of a predetermined height and a predetermined diameter, said predetermined diameter being slightly less than said preselected diameter of said hole in said filler plug;

a sleeve slidably mounted upon said shank and being of a height slightly less than said predetermined height of said shank; and

height adjustment means interposed between an end of said sleeve and said base of said support means for controlling the position of said sleeve relative to said support means in order to expose a predetermined amount of said shank beyond said sleeve;

whereby said predetermined amount of said shank protrudes into said hole of said filler plug so as to mount said filler plug upon said support means in abutting relationship with

said sleeve in order to control the amount of material which remains as part of said filler plug during the milling procedure.

4,873,795

COVERING FOR A GROUND OPENING

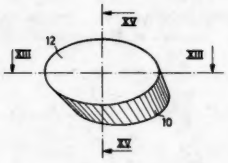
Hansruedi Spiess, Delemont, and Francois Galvanetto, Alle, both of Switzerland, assignors to Von Roll, AG., Gerlafingen, Switzerland

Filed Nov. 2, 1988, Ser. No. 266,395

Claims priority, application European Pat. Off., May 12, 1988, 88107651.7

Int. Cl.[4] E02D *29/14*

U.S. Cl. 52—20 14 Claims



1. Covering for a ground opening, comprising a frame and a cover inserted and supported in the frame, the cover having an external circumferential supporting surface and the frame having an internal bearing surface, said supporting surface and said bearing surface being formed as mating cooperating surfaces inclined with respect to a cover plane, said supporting surface of the cover and said bearing surface of the frame being partial surfaces of a sloping rotation-symmetrical body essentially bounded by sections in such a way that the inclination of the support surface of the cover and the bearing surface of the frame have along a circumference thsreof a different slope with resepct to the cover plane so that the cover can be placed into the frame in only one position.

4,873,796

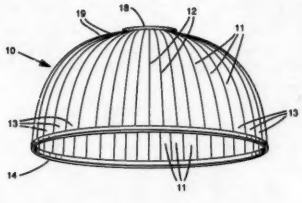
DOME STRUCTURE

Kemal Akmese, 178 Flood Ave., San Francisco, Calif. 94131

Filed May 27, 1988, Ser. No. 199,601

Int. Cl.[4] E04B *1/32*

U.S. Cl. 52—80 14 Claims



1. A dome-like structure, comprising,

a large plurality of separately formed generally arcuate wood segments, preformed in said generally arcuate shape and essentially unstressed in the assembled dome-like structure, each subtending an arc from a base end of the segment and of the structure to an apex end of the segment and of the structure, each segment having outer and inner faces which taper in width from a maximum width at the base end of the segment progressively to a minimum width at the apex end of the segment,

substantially each segment being connected at its two edges directly to two similar adjacent segments, one on either side, at joints lying in planes substantially perpendicular to a base plane containing the base ends of a segment, and the edges of adjacent segments being closely and substantially abutted, with the edge angle between the edge of a segment and a face of the segment varying from the base end to the apex end, from a maximum deviation from perpendicular at the base end to substantially perpendicular at the apex end,

shape reinforcing means at least at the base ends of the segments, for reinforcing the shape of the base end of the structure,

the structural connections between segments being made entirely via the edges of the segments, aside from the presence of said shape reinforcing means, and

the segments together serving as structural supporting elements of the dome-like structure as well as inner and outer surfaces of the structure without any other structural framework or connection members on the inner or outer surfaces along or traversing the segments between the base ends and the apex ends.

4,873,797

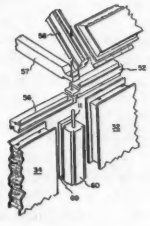
STRESSED SKIN POST AND BEAM BUILDING CONSTRUCTION SYSTEM

Robert J. Rydeen, Brentwood, N.H., assignor to R. J. Ryddeen & Associates, Brentwood, N.H.

Filed Jun. 1, 1988, Ser. No. 201,048

Int. Cl.[4] E04C *1/24*

U.S. Cl. 52—93 8 Claims



1. A stressed skin post and beam construction comprising:

(a) a first post;

(b) a first beam parallel to an exterior wall of the building and resting on said first post;

(c) a second beam aligned with said first beam and resting on said first beam; and

(d) a second post, a sill, and a stressed skin wall panel wherein;

(e) said stressed skin consists of an exterior wall panel, an interior wall panel and rigid insulating material structurally connecting the exterior and interior wall panels together;

(f) said second post is adjacent said first post and supports said first beam;

(g) said first and second posts rest on said sill;

(h) adjacent, exterior edges of said first and second posts and said first beam have two-sided cutouts therein, said cutouts rigidly receiving opposite side and end portions of said exterior wall panel; and

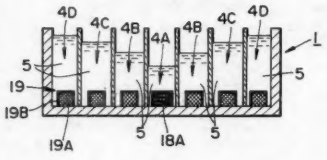
(i) inwardly facing surfaces adjacent interior edges of said first and second posts and said first beam have grooves therein, said grooves respectively receiving side and end portions of said interior wall panel.

4,873,798

APPARATUS FOR SUPPRESSING VIBRATION OF STRUCTURE

Takanori Sato, Tokyo, Japan, assignor to Shimizu Construction Co., Ltd., Tokyo, Japan

Filed Nov. 14, 1988, Ser. No. 271,104
Claims priority, application Japan, Nov. 17, 1987, 62-290236
Int. Cl.[4] F16F 7/10; F23J 13/00
U.S. Cl. 52—167 DF 7 Claims



1. An apparatus for suppressing vibration of a structure, the apparatus comprising:

a tank adapted to be mounted in the structure and having a bottom;

at least one annular partition wall concentrically arranged within said tank and erected on the bottom of said tank, said partition wall defining a plurality of annular chambers concentric about a vertical axis of said tank to receive a liquid for suppressing vibration of the structure, each of said chambers being adapted to contain such an amount of said liquid that said liquid in each chamber is equal in natural period to the structure, the total amount of said liquid in said tank being such that a ratio of effective mass of said liquid over mass of the structure is about 1/300 to about 1/50; and

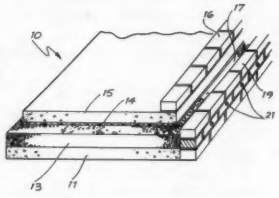
vibration damping means arranged in at least one of said chambers for damping vibration of said liquid contained in the at least one chamber, occasioned due to swinging of the structure, said vibration damping means comprising one or more screen members, each of said screen members comprising a mesh and being erected on the bottom of said tank and extending radially from said vertical axis relative to at least one said chamber, wherein said screen member allows said liquid to flow therethrough so as to baffle a circumferential flow of said liquid to said chamber due to the swinging of the structure.

4,873,799

DAMP-PROOF COMPOSITE FLOORING

Attila J. Flink, 29 Waratah St., Rushcutters Bay NSW, Australia (2011)

Filed Aug. 24, 1987, Ser. No. 88,630
Int. Cl.[4] E02D 27/00
U.S. Cl. 52—169.8 17 Claims



1. A flooring system comprising:

a lower surface sloping to at least one side;

a collection chamber, situated to receive water from said lower surface;

a drainage layer, comprising bricks or brick piers, situated above said lower surface such that water can flow along said lower surface;

a substantially water impervious layer, disposed above said drainage layer;

said drainage layer defining a cavity between said lower surface and said substantially water impervious layer;

a floor layer, disposed above and in contact with said substantially water impervious layer; and

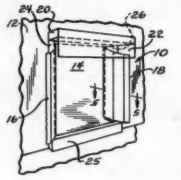
pump means for removing water from said collection chamber.

4,873,800

LOADING DOCK SEAL

John A. Frommelt, Dubuque, Iowa, and Kenneth Lenz, East Dubuque, Ill., assignors to Frommelt Industries, Inc., Dubuque, Iowa

Filed Feb. 3, 1988, Ser. No. 151,874
Int. Cl.[4] E04H 14/00
U.S. Cl. 52—173 DS 15 Claims



1. A seal for use with a vehicle having a pair of facing, generally vertical side panels having rear edge portions, said seal comprising:

a plurality of flexible, resilient members each having a distal end and a proximal end mounted to a wall in a spaced manner adjacent to a lateral portion of an opening in said wall and extending outward from said wall and away from the opening therein when not in use;

a cover disposed over and encompassing said flexible, resilient members;

at least one generally vertically oriented reinforcing member extending substantially the entire length of said seal, wherein said at least one generally vertically oriented reinforcing member is disposed in a spaced manner from the proximal end of each of said flexible, resilient members; and

gripping means attached to said cover and facing the opening in the wall for allowing said seal to be pulled inwardly toward the opening and into an aft portion of the vehicle such that upon release of said gripping means the distal end of said flexible, resilient members ergages an inner portion of said side panel and said send extends between the vechicle and the wall.

4,873,801

METHOD AND APPARATUS FOR SEALING AND PROTECTING LOADING DOCK DOORWAYS

William L. Winters, 2975 Haywood Ave., Chattanooga, Tenn. 37415

Filed Nov. 28, 1988, Ser. No. 276,965
Int. Cl.[4] E04H 14/00
U.S. Cl. 52—173 DS 14 Claims

1. A self-positioning, durable, loading dock doorway seal and protector for providing a weather and conditioned-air seal between docking vehicles and loading dock structure and for providing protection to doorway structure, padding and seal material comprising:

a rocker arm assembly having a pair of rocker arms with

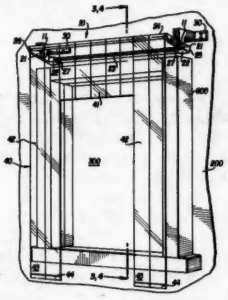
each arm having an inner end and an outer end and a coincident axis point, counterweight support means, counterweights of slightly more weight than necessary to counterbalance said rocker arm assembly, and a curtain anchoring means;

means for mounting said rocker arm assembly to a loading dock wall;

means for rotatably attaching said rocker arm assembly to said mounting means;

means attached to said mounting means for restraining the rotation of said rocker arm assembly;

means for attaching said counterweight support means to said rocker arms;



a plurality of vertically split and overlapping sealing strips attached at one end to said curtain anchoring means whereby said strips are arranged to form a top curtain section and two side curtain sections which are positioned on said curtain anchoring means to border the top and sides of a loading dock doorway;

means for attaching said strips to said curtain anchoring means; and,

weighting means attached to the face end of each sealing strip comprising said side curtain sections to provide for curtain stability and proper sealing tension against the sides of docking vehicles.

4,873,802

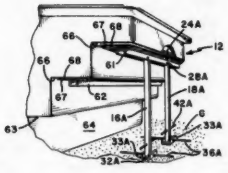
PLASTIC MODULE RIGIDIZING SYSTEM

Donald E. Dahowski, York, Pa., assignor to Quaker Plastic Corporation, Mountville, Pa.

Filed Nov. 17, 1987, Ser. No. 121,496

Int. Cl.[4] E04H *3/16*

U.S. Cl. 52—184 **17 Claims**



11. A prefabricated structural module whose flexure is stabilized so as to have a controlled rigidity comprising in combination

(a) a first element of plastic composition and

(b) a second element permanently bonded to and having a different coefficient of expansion from said first element,

said first element presenting a surface to which the surface of the of said second element is bonded comprised of a plurality of apices and valleys and wherein the bonding between the surfaces of the first and second elements is intermittent and is substantially only on the apices of said first element.

4,873,803

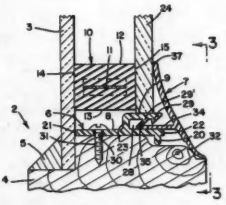
INSULATING A WINDOW PANE

John R. Rundo, Strongsville, Ohio, assignor to The B.F. Goodrich Company, Akron, Ohio

Filed Jun. 13, 1988, Ser. No. 206,075

Int. Cl.[4] E06B *3/54*

U.S. Cl. 52—202 **6 Claims**

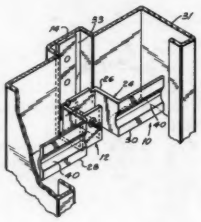


1. A double glazed window structure consisting of a rectangular window frame; a first pane seated in said window frame; said first pane having an exterior surface, an interior surface and a periphery; said window frame being recessed to abuttingly contact said interior surface along said periphery to receive said first pane to define a one piece unit; glazing means abutting the periphery of said exterior surface of said first pane and said window frame to securely fasten and retain said first pane in said window frame; a sealant tape mounted around and adhered to the peripheral interior surface of said first pane, a flat longitudinally extending rigid retainer support member mounted on said window frame closely adjacent said peripheral interior surface of said first panel; said retainer having a forwardly disposed edge and a rearwardly disposed edge; said forwardly disposed edge abutting said first pane; said retainer having a plurality of spaced holes closely adjacent to said forwardly disposed edge to receive securing means to fasten said retainer to said window frame; said retainer having a midportion located between said forwardly disposed edge and said rearwardly disposed edge; said retainer having a longitudinally extending flange member integrally connected to said midportion of said retainer; said flange member cooperative with that portion of said retainer adjacent to said rearwardly disposed edge to define a narrow channel therebetween; said flange portion disposed inside of said narrow channel has at least a pair of abutments; a second pane having the peripheral edge of one surface in abutting contact with said sealant tape; said second pane having its peripheral edge in sealing contact with said flange; a thin longitudinally extending flat rigid trim member having a running length with an upper portion and a lower portion; the juncture of said upper portion and said lower portion having an outwardly extending thin continuous strip member; and said strip member having an abutment for locking engagement with said abutments in said narrow channel to position the uppermost end of said upper portion against the other peripheral surface of said second pane to exert a pressure thereon as said lower portion flexes and contacts said window frame.

4,873,804
DRYWALL FRAME COMPRESSION ANCHOR ASSEMBLY AND FRAME

Gopal S. Kukke, Manalapan, N.J., assignor to Pioneer Industries, Division of Core Industries, Inc., Carlstadt, N.J.

Filed Oct. 11, 1988, Ser. No. 256,046
Int. Cl.[4] E06B 1/60
U.S. Cl. 52—217 23 Claims



1. A drywall frame compression anchor assembly for use with a frame to be mounted in an opening of a wall, comprising:

support means having a pair of spaced support legs;

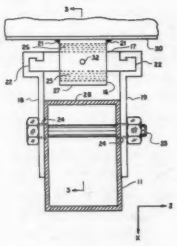
a jamb anchor including a center portion and a pair of oppositely extending wings projecting therefrom, said jamb anchor moveably mounted between said support legs; and

means for moving said jamb anchor between said support legs to engage the surface of an opening of a wall including a threaded opening in said center portion of said jamb anchor and screw means having a head and a shank portion, said shank portion arranged in threaded engagement with said threaded opening in said center portion and supported by an opening in at least one of said support legs so that upon rotation of said screw means, the jamb anchor travels along said shank portion between said support legs.

4,873,805
CONNECTING MEANS OF CURTAINWALL SUPPORTING MULLIONS

Raymond M. L. Ting, 318 Holiday Dr., Pittsburgh, Pa. 15237

Filed Jul. 21, 1988, Ser. No. 222,564
Int. Cl.[4] E04B 2/88
U.S. Cl. 52—235 6 Claims



1. A curtainwall structure forming an exterior wall surface defining a X-direction being horizontally perpendicular to said wall surface, a Y-direction being vertically parallel to said wall surface, and a Z-direction being horizontally parallel to said wall surface, said curtainwall structure being supported on at least two spaced apart mullions spanning in said Y-direction, each said mullion being connected to a building frame at at least two locations along said Y-direction using a first connection means and at least one second connection means, said first connection being fixed in both said X-direction and Y-direction, said second connection means being fixed in said X-direction and slidable in said Y-direction, the improvement of said second connection means comprising:

(a) a housing clip having at least one web integrally connecting with two spaced apart flanges;

(b) said housing clip being firmly fixed to said building frame in said X-direction, Y-direction, and Z-direction, forming a hollow space along said Z-direction, said hollow space being defined by a hollow depth in said X-direction, a hollow height in said Y-direction, and a hollow length in said Z-direction;

(c) a holding clip having a width in said Z-direction being larger than said hollow length, a length in said Y-direction being smaller than said hollow height, a depth in said X-direction being smaller than said hollow depth, and having an engaging profile slidable in said Y-direction and fixed in said X-direction and Z-direction along side edge parallel to said Y-direction;

(d) said holding clip being secured and fixed in said X-direction within said hollow space where said engaging profiles being positioned out of said hollow space;

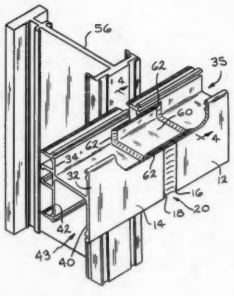
(e) at least one fastening clip having a slidable engaging profile matched with said engaging profile of said holding clip and an integral fastening flange having a surface parallel to a plane defined by said X-direction and Y-direction;

(f) said mullion being firmly fastened to said fastening flange of said fastening clip slidably engaged along the edge of said holding clip.

4,873,806
FLEXIBLE SPLICE FOR METAL FRAME MEMBERS IN A CURTAIN WALL

Fred G. Jeschke, Whitmore Lake, Mich., assignor to American Glass and Metal Corporation, Plymouth, Mich.

Filed Nov. 14, 1988, Ser. No. 270,075
Int. Cl.[4] E04H 1/00; E04C 3/30
U.S. Cl. 52—235 4 Claims



1. In a curtain wall structure having a plurality of wall panel members supported vertically in a frame structure wherein the frame structure includes:

a plurality of support members for said panels arranged in end-to-end relation with adjacent ends of adjacent members being spaced from one another; the improvement comprising:

at least one slab member formed of a flexible sealant material bridging the space between the adjacent ends of a pair of adjacent support members, and a flowable silicone caulking material adhering said slab to said adjacent ends of said adjacent members.

4,873,807

ROOF INSULATING AND WATERPROOFING METHODS AND STRUCTURES

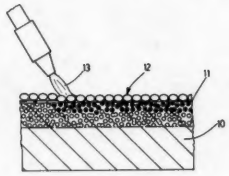
Stanislaw Filip, 141 Davisvill Ave. Apt. 806, Toronto, Ontario, Canada M4S 1G7

Filed Sep. 28, 1988, Ser. No. 250,067

Claims priority, application United Kingdom, Sep. 30, 1987, 8722939

Int. Cl.[4] E04B *1/00*

U.S. Cl. 52—408 **7 Claims**



1. A method of insulating and waterproofing a generally horizontal roof, comprising:

forming an insulating layer of heat-resistant foam material over the roof;

forming a layer of tar immediately over and against the insulating layer;

depositing a layer of gravel over the tar layer;

heating the tar sufficiently that the tar is drawn upwardly through the gravel to form a bond with the gravel layer and the tar forms a bond with the layer of foam material.

4,873,808

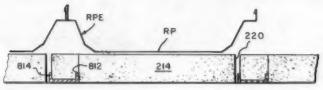
SPACER BLOCK FOR STANDING SEAM ROOF

Raymond K. Heisey, Jr.; W. David Barker, both of Kansas City; Arturo C. Mariano, Independent, and Vernon L. Thurnau, Kansas City, all of Mo., assignors to Butler Manufacturing Company, Kansas City, Mo.

Continuation of Ser. No. 602,488, Apr. 20, 1984, abandoned. This application Mar. 27, 1989, Ser. No. 328,717

Int. Cl.[4] E04D *1/34*; E04B *5/00*

U.S. Cl. 52—478 **22 Claims**



1. A standing seam roof panel support device, comprising:

an elongated spacer block for supporting and spacing a roof panel upon a building roof structural element;

external aligning means on one end of said spacer block for contacting engagement with a roof panel mounting clip;

additional external aligning means on the other end of said spacer block for complementary association with another roof panel mounting clip; and

said external aligning means on said one end of said spacer block for engaging a roof panel mounting clip comprising a single tenon projection extending outwardly from said end so that transverse flanges on said mounting clip can transversely engage with said tenon projection on opposite sides thereof to locate and align the spacer block both longitudinally and laterally on the roof structural element.

4,873,809

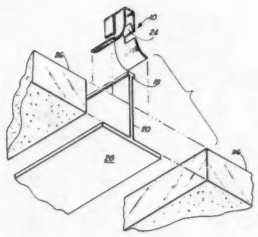
CEILING TILE HOLD DOWN CLIP

Harold J. Paul, 2015 Magnolia Ave., Pensacola, Fla. 32503

Continuation-in-part of Ser. No. 170,810, Mar. 21, 1988. This application Aug. 26, 1988, Ser. No. 240,063

Int. Cl.[4] E04B *5/57*

U.S. Cl. 52—489 **3 Claims**



3. A ceiling tile hold down clip for mounting on the cross support of a plurality of ceiling tile sections, said clip comprising:

(a) a substantially flat rectangular main body portion, thus defining opposing lateral sides and edges;

(b) a pair of arcuately shaped spaced apart retaining arms extending downwardly and outwardly from diagonally positioned portions of the opposing lateral sides of said main body portion, said retaining arms having lower and upper portions, said lower portion being substantially widened with respect to said the upper portion thereof, but widened no further than said edges of said main body portion, and adapted for engaging with its lower concave surface the upper surface of one of said ceiling tile sections; and,

(c) a pair of locking arms extending downwardly from opposing sides of said main body portion and positioned opposed and substantially parallel to said retaining arms at the upper portions of said retaining and locking arms, each of said locking arms having proximate and distal ends, and having at its distal end a lip portion which extends inwardly toward said opposed retaining arm and upwardly toward said main body portion for engaging said cross support of said ceiling tile section.

4,873,810

ELEMENTS HAVING A MULTI-DIRECTIONAL CELLULAR STRUCTURE WHOSE INERTIA MAY VARY, AND METHODS OF MANUFACTURE

Jean Lecaroz, 6, Place Corneille, 92100 Boulogne, France

PCT No. PCT/FR85/00259, § 371 Date Jul. 6, 1987, § 102(e) Date Jul. 6, 1987, PCT Pub. No. WO87/01789, PCT Pub. Date Mar. 26, 1987

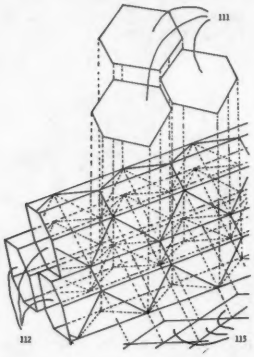
PCT Filed Sep. 23, 1985, Ser. No. 72,241

Int. Cl.[4] E04B *1/62*

U.S. Cl. 52—575 **39 Claims**

1. An element of multi-directional cellular structure formed by a plurality of series of hollow closed shell-like elements each of polygonal section which intersect, each of said series being composed of a plurality of convex closed prismatic shell-like elements of a same direction which are joined by one common plate face, wherein only the shell-like elements of a same series have common face planes, and the intersections of the shell-like elements define juxtaposed cells, each edge on

one shell-like element of a given direction intersecting at least one edge of a shell-like element of another direction and each



edge of each cell being entirely contained in the intersection of the planes of the shell-like elements.

4,873,811

SHREDDER

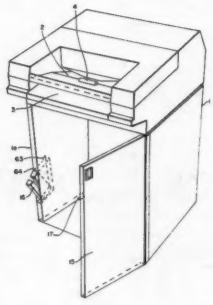
Masayoshi Izumitani, and Akihiro Soga, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 47,766, May 8, 1987, abandoned. This application Aug. 29, 1988, Ser. No. 239,026

Claims priority, application Japan, May 13, 1986, 61-72427

Int. Cl.[4] B65B *51/06*

U.S. Cl. 53—138 A **3 Claims**



1. In a shredder having a housing which contains a bag therein for holding shredded materials and a door for opening and closing an opening in said housing through which said bag is removed from inside said housing, the improvement wherein said shredder further comprises a bag closing device retractably attached to said housing near said opening such that said bag closing device is normally contained inside said housing and is automatically moved, when said door is opened, to an operative position at which said bag closing device is operable.

4,873,812

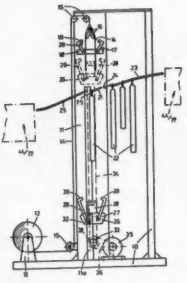
CLOTHING ARTICLE PACKAGING MACHINE

Wilfried Pavel, Halle/Westf., Fed. Rep. of Germany, assignor to Wilfreid Pavel Machinenbau, Halle/Westf., Fed. Rep. of Germany

Filed Sep. 10, 1987, Ser. No. 95,099

Int. Cl.[4] B65B *9/12, 5/02*

U.S. Cl. 53—241 **18 Claims**



1. A packaging machine for packaging objects, especially clothing articles, in a packaging portion of a hose-shaped synthetic plastic material foil that is contained on a roll, comprising:

a machine frame;

means for rotatably mounting the roll of the synthetic plastic material foil on said machine frame;

means for guiding the foil unwound from the roll along a predetermined path to an upper region of said machine frame, including diverting rollers engaging the unwound foil;

means for opening the hose-shaped foil at said upper region of said machine frame;

means for welding the foil at said upper region of said machine frame along a predetermined imaginary line situated between the packaging portion and the remainder of the foil with attendent formation of an upper welding seam, and for dissociating the packaging portion at said upper welding seam from the remainder of the foil;

means for supporting the objects to be packaged;

means for pulling the opened hose-shaped foil downwardly over the clothing article to be packaged, including a foil-pulling carriage guided on said machine frame for an up-and-down displacement, and means including a motor for upwardly and downwardly displacing said carriage;

lower welding means mounted on said carriage for joint movement therewith and operative for welding the packaging portion of the foil after it has been pulled all the way over the clothing article being packaged, at a location disposed downwardly of the clothing article, with attendant formation of a lower welding seam; and

means for transporting the clothing articles hanging on clothes hangers having respective hooks, including a supply conveyor, a displaceable receiving carrier including a carrier beam, and means for transferring the clothing articles suspended by the hooks of their hangers from said supply conveyor to said receiving carrier, including a transfer guide which receives the clothing articles in their suspended positions from said supply conveyor, and means to pivot the transfer guide up and down about a horizontally and inclinedly extending pivoting axle, thereby transferring the clothing articles to said receiving carrier in such a manner that the hooks of their hangers engage and extend over and partially around said carrier beam.

4,873,813

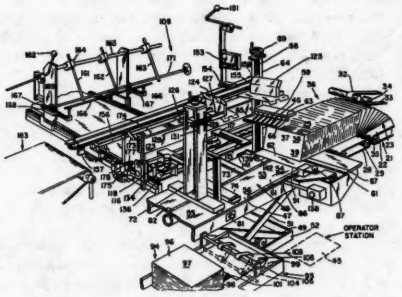
METHOD OF PACKAGING BOX FLATS

Raymond A. Labombarde, Nashua, and Robert A. Tremblay, Hollis, both of N.H., assignors to International Paper Box Machine Co., Inc., Nashua, N.H.

Division of Ser. No. 872,559, Jun. 10, 1986, Pat. No. 4,707,970, which is a continuation-in-part of Ser. No. 583,640, Feb. 27, 1984, abandoned. This application Mar. 17, 1987, Ser. No. 26,756

Int. Cl.[4] B65B *63/02*

U.S. Cl. 53—438 3 Claims



1. The method of individually and successively filling a plurality of empty corrugated cases with pre-counted, compressed slugs of flats, by a single operator, at a single station proximate the delivery end of the stacker apron of a folder-gluer, by means of an inspection and compressor table, in extension of said apron, a cantilevered back stop, a case gripper, and a substantially horizontal transfer table which comprises the steps of:

advancing said flats in pre-counted segmented, individual slugs, while in upright position on edge, for easy grasp of a slug between the hands of the operator;

presenting a plurality of flat, tubular, corrugated cases, each with the leading top flaps folded back, individually and successively to the operator, at said station, for withdrawal and insertion into said case gripper to close the minor bottom flaps and hold open the top flaps;

positioning said case gripper, with the open case therein, supported on a side wall of the level of said transfer table ready to slidably receive a compressed slug of flats therein;

sliding the element, pre-counted slug of flats from said apron onto said transfer table, compressing the slug and then sliding the compressed slug into the case in said case gripper;

then moving said case gripper and case away from said transfer table for discharge.

4,873,814

METHOD OF MAKING A SHRINK WRAP PACKAGE

Charles C. Harris, 1611 Manufacturers Dr., St. Louis, Mo. 63026

Division of Ser. No. 233,886, Aug. 16, 1988, Pat. No. 4,815,603, which is a continuation of Ser. No. 916,711, Oct. 8, 1986, abandoned. This application Dec. 9, 1988, Ser. No. 282,378

Int. Cl.[4] B65B *43/02, 53/06*

U.S. Cl. 53—442 6 Claims

1. A method of producing a shrink-wrap plastic package from a container having peripheral margin defining an open top comprising the steps of:

(a) forming a plastic shell having front and rear panels defining an upper shell portion having upper margins and a lower shell portion having lower margins,

(b) disposing the shell in a flat condition,

(c) heat sealing the upper margins to close the upper shell portion but maintaining the lower shell margins in an unsealed condition,

(d) perforating the front and rear panels at least the upper shell portion while the front and rear panels are in the flat condition the perforations in the front and rear panels being in register,

(e) placing the shell over the open top of the container so that the lower shell portion is disposed below the container margin and the upper shell portion is disposed above the container margin,

(f) applying heated air to the shell to shrink said shell into shrink wrap relation with the container, the vent openings being of sufficient size and number to permit air passage in and out of the shell upper portion.

4,873,815

APPARATUS FOR FILLING AND CLOSING SACKS WHICH ARE OPEN AT ONE END

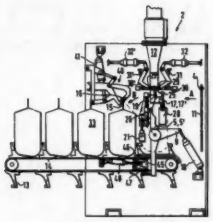
Konrad Tetenborg; Heinz Eschmann, and Helmut Hüwelmann, all of Lengerich, Fed. Rep. of Germany, assignors to Windmoller & Holscher, Lengerich, Fed. Rep. of Germany

Filed May 11, 1988, Ser. No. 192,635

Claims priority, application Fed. Rep. of Germany, May 11, 1987, 3715684

Int. Cl.[4] B65B *43/26*

U.S. Cl. 53—570 11 Claims



1. An apparatus for filling and closing sacks comprising means defining a sack filling station and means defining a sack welding station, a transfer conveyor having means for conveying sacks in a freely suspended condition into the filling station, spaced pivoted arms in the filling station having free ends with grippers for taking sacks over from the transfer conveyor and gripping opposite upper ends of a sack, a pair suction cups in the filling stations for pulling side walls of the sacks apart adjacent upper edges thereof between the grippers, a filling pipe in the filling station, means for lowering the filling pipe into a sack when said walls have been pulled apart for filling the sack and for lifting the pipe from the sack, a turning drive for rotating said arms to move a sack from the filling station to the welding station and for returning the arms to the filling station, actuating means for closing the grippers to grip a sack at the filling station and for opening the grippers at the welding station, and welding jaws at the welding station for forming a weld adjacent said upper edges of a sack prior to opening of the grippers.

4,873,816

ARRANGEMENT FOR FITTING VALVE SACKS ON FILLING PIPE OF PACKAGING MACHINE

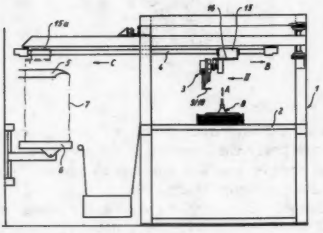
Helmut Mittelbach, Oelde, Fed. Rep. of Germany, assignor to Haver & Boecker, Oelde, Fed. Rep. of Germany

Filed Jan. 7, 1988, Ser. No. 142,801

Claims priority, application Fed. Rep. of Germany, Jan. 8, 1987, 3700345; May 13, 1987, 3715926

Int. Cl.[4] B65B *43/26*

U.S. Cl. 53—573 **31 Claims**



1. An arrangement for fitting on a filling pipe of a packaging machine non-rigid side-fold valve sacks including each a valve, said arrangement comprising a displaceable spreading means having valve spreading elements insertable into a preliminary open value of a first valve sack separated from a valve sack stack for pulling up the valve, said spreading means being rotatable about a horizontal axis to position the value relative to the filling pipe, said arrangement further comprising means forming a horizontal guide path for supporting said spreading means for movement therealong for fitting the first value sack on the filling pipe.

4,873,817

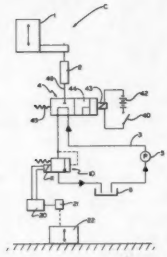
ELECTRICALLY CONTROLLED PRESSURE RELIEF VALVE SYSTEM AND METHOD

Louis C. Harms, Evanston, Ill., assignor to United Technologies Automotive, Inc., Dearborn, Mich.

Filed Aug. 1, 1988, Ser. No. 226,658

Int. Cl.[4] A01D *47/00, 75/28;* F16K *31/06, 31/122*

U.S. Cl. 56—10.2 **11 Claims**



1. An electrically controlled pressure relief valve system for varying the maximum allowable line pressure in as associated fluid line in response to an electrical signal, comprising:

an inlet line for containing fluid under pressure;

a tank line leading to a fluid tank at a relatively low pressure to that normally contained in said inlet line;

a proportional, pressure relief valve located in line between said inlet line and said tank line, blocking the two off when a relatively low pressure exists in said inlet line, said pressure relief valve including

a cartridge,

a longitudinally extended cage held by said cartridge and associated with said inlet line,

a longitudinally movably, centrally open pilot spool located within said cage in and in fluid communication with said inlet line, said spool having a front orifice associated with the centrally open area of said spool and communicating with said inlet line and having a substantially smaller cross-sectional area than the most adjacent part of said inlet line, causing a pressure drop across said spool as fluid passes through said orifice from said inlet line, and said cage having a back orifice associated with said centrally open area through which fluid can flow under certain pressure conditions to said tank line,

a valve element seat surrounding said back orifice,

a longitudinally movable valve element associated with said seat tending to close off said back orifice tending to prevent fluid flow through it, and

biasing spring means associated with said movable valve element for applying an initial, minimum resistive biasing force against said valve element tending to keep it seated in said seat;

a direct, side port leading from said inlet line to said tank, said port having a cross-sectional area substantially greater than said front orifice and being located in juxtaposition to the side of said pilot spool and being normally blocked off by said spool under the action of said biasing spring at least until the pressure in said inlet line at least equals the resistive biasing force but, as the inlet pressure increases, said pilot spool tending to allow fluid to flow from said inlet line through said front orifice to said centrally open area through said back orifice overcoming the biasing force of said spring to said tank, upon which said spool begins to move back until it exposes said port to said inlet line, causing the relatively high pressure of said inlet line to be limited by the relatively low pressure in said tank line;

electrical means associated with said valve element for applying a supplemental resistive force to it, increasing the resistive pressure upon it over the initial, biasing spring force, further tending to keep said valve element seated, closing off any fluid flow through said back orifice;

electrical signal means associated with said electrical means for varying the amount of resistive force applied by said electrical means to said valve element, allowing the maximum allowed pressure allowed in said inlet line before its is exhausted to said tank line to be variously set by utilizing said electrical signal; and

work means associated with said inlet line, which work means is caused to do desirable work at a rate set in accordance with the varying set maximum pressure levels in said inlet line, said electrical signal means effectively controlling said work means in accordance with the electrical signal produced by said electrical signal means.

9. An agricultural combine with an electrically controlled pressure relief valve system for varying the maximum allowable line pressure in an associated hydraulic fluid line in response to an electrical signal, comprising:

an inlet line for containing hydraulic fluid under pressure;

a tank line leading to a hydraulic fluid tank at a relatively low pressure to that normally contained in said inlet line;

a proportional, pressure relief valve located in line between said inlet line and said tank line, blocking the two off when a relatively low pressure exists in said inlet line, said pressure relief valve including

a cartridge,

a longitudinally extended cage held by said cartridge and associated with said inlet line,

a longitudinally movably, centrally open pilot spool located within said cage and in fluid communication with said inlet line, said spool having a front orifice associ-

ated with the centrally open area of said spool and communicating with said inlet line and having a substantially smaller cross-sectional area than the most adjacent part of said inlet line, causing a pressure drop across said spool as fluid passes through said orifice from said inlet line, and said cage having a back orifice associated with said centrally open area through which fluid can flow under certain pressure conditions to said tank line,

a valve element seat surrounding said back orifice,

a longitudinally movable valve element associated with said seat tending to close off said back orifice tending to prevent fluid flow through it, and

biasing spring means associated with said movable valve element for applying an initial, minimum resistive biasing force against said valve element tending to keep it seated in said seat;

a direct, side port leading from said inlet line to said tank, said port having a cross-sectional area substantially greater than said front orifice and being located in juxtaposition to the side of said pilot spool and being normally blocked off by said spool under the action of said biasing spring at least until the pressure in said inlet line at least equals the resistive biasing force but, as the inlet pressure increases, said pilot spool tending to allow hydraulic fluid to flow from said inlet line through said front orifice to said centrally open area through said back orifice overcoming the biasing force of said spring to said tank, upon which said spool begins to move back until it exposes said port to said inlet line, causing the relatively high pressure of said inlet line to be limited by the relatively low pressure in said tank line;

electrical means associated with said valve element for applying a supplemental resistive force to it, increasing the resistive pressure upon it over the initial, biasing spring force, further tending to keep said valve element seated, closing off any fluid flow through said back orifice;

electrical signal means associated with said electrical means for varying the amount of resistive force applied by said electrical means to said valve element, allowing the maximum allowed pressure allowed in said inlet line before its is exhausted to said tank line to be variously set by utilizing said electrical signal; and

work means associated with said inlet line, which work means is caused to do desirable work at a rate set in accordance with the varying set maximum pressure levels in said inlet line, said electrical signal means effectively controlling said work means in accordance with the electrical signal produced by said electrical signal means, said work means including:

an agricultural combine;

a combine header carried by said combine;

an hydraulic circuit associated with said inlet line, said tank line and said pressure relief valve;

hydraulic lift means included in said circuit and connected to said header for moving said combine header to a vertical position off of the ground and at a speed dependent upon the hydraulic pressure existent in said inlet line, said hydraulic lift means including

a gravity lowered hydraulic ram connected to said combine head; and

an "on/off" control valve connected between said hydraulic ram and said inlet line controlling the hydraulic fluid pressure supplied to said ram controlling its direction and speed of movement in conjunction with said pressure relief valve,

ground contour sensing means associated with said combine measuring the changing contour of the ground over which said combine travels as the combine travels over the ground and is being operatively used, said ground contour sensing means including a ski sled carried by said combine in contact with the ground; and

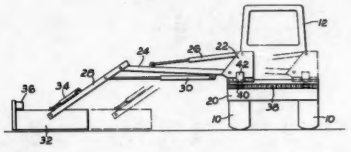
computer means associated with said combine for interpreting the output of said ground sensing means and controlling said electrical signal means producing appropriate electrical signals to be sent to said electrical means appropriately changing the set maximum allowed pressure allowed in said inlet line, appropriately moving said combine header in response thereto.

4,873,818

LATERALLY ADJUSTABLE MOWER

Anthony L. Turner, Alcester, England, assignor to Turner International (Engineering) Limited, England

Continuation of Ser. No. 853,431, Apr. 18, 1986, abandoned.
This application Feb. 25, 1988, Ser. No. 163,195
Int. Cl.[4] A01D *34/64, 35/28*
U.S. Cl. 56—10.8 **5 Claims**



1. A mobile mower comprising a vehicle having a length dimension and a width dimension; a cutting head; a mounting bracket having length and width dimensions each of which is substantially less than the width dimension of said vehicle; extensible and retractable articulated linkage means interposed between said cutting head and said bracket; means securing one end of said articulated linkage means to said cutting head; means securing the opposite end of said articulated linkage means to said bracket; power means for extending and retracting said articulated linkage means to enable said cutting head to be moved toward and away from said bracket; a support beam secured to said vehicle and extending from side to side of said vehicle; means mounting said bracket directly on said beam for movements to and fro along a path from either side of said vehicle to the other side thereof, said path having a length dimension corresponding substantially to the width dimension of said vehicle; and reversible power drive means for driving said bracket in a selected one of two opposite directions along said path regardless of whether said vehicle is moving or stationary, thereby enabling said cutting head to be moved to and from any selected position on said path between a maximum extended position relative to one side of said vehicle and a maximum retracted position closely adjacent said one side of said vehicle, said maximum positions being determined in part by the length dimension of said path and the position of said bracket on said path, said drive means when inactive being operable to maintain said bracket in said selected position.

4,873,819

GRASS TRIMMER

Charles C. Shivers, 614 W. English, Corydon, Iowa 50060, and Alvin Arnold, 505 N. Front St., Humeston, Iowa 50123

Continuation of Ser. No. 924,276, Oct. 29, 1986, abandoned.
This application Aug. 12, 1988, Ser. No. 232,564
Int. Cl.[4] A01D *34/63*
U.S. Cl. 56—17.5 **10 Claims**

1. A grass and weed trimmer apparatus comprising:

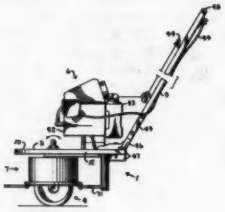
(a) a structural frame;

(b) an operator handle connected to said frame and adapted to be manipulated by an operator;

(c) a single surface engaging wheel allowing locomotion of said apparatus over a surface; said wheel being connected to and supporting said structural frame; during normal operation said single wheel fully supporting said frame except for operator support provided through said handle;

(d) rotatable cutting means connected to said frame and rotating about said wheel such that said wheel supports said frame from generally directly beneath said cutting

means; said apparatus being free of additional surface engaging support structure during operational use other than that provided by said wheel and interaction with an operator such that said frame may be selectively tilted from side to side and front to back about said wheel by an operator during use to vary cutting height associated with



said cutting means whereby said cutting means may be selectively positioned in close proximity to the ground at any location along a 360° arc surrounding said wheel so as to be able to cut close to the ground on any side of said wheel during use; and

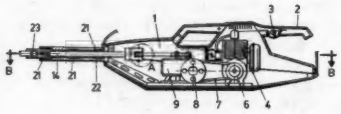
(e) motor means connected to said frame and operably driving said cutting means.

4,873,820

PORTABLE VIBRATING APPARATUS FOR THE COLLECTION OF FRUITS

D. Aurelio T. Martorell, Tarragona, Spain, assignor to Geiver, S.A., Ulldecona, Spain

Filed Dec. 6, 1988, Ser. No. 280,639
Int. Cl.[4] A01D *46/00*
U.S. Cl. 56—340.1 **1 Claim**



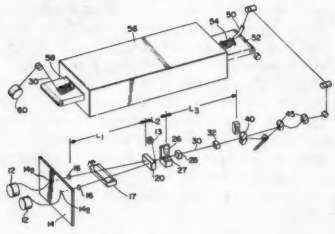
1. Portable vibrating apparatus for the collection of fruits, which having been designed to produce oscillating movements on the branches of certain fruit trees, preferably olive trees and dry fruit trees, to obtain the detachment of the fruits and their respective fall, and being provided to be handled manually be an operator, consisting of a general casing in which there is a motor which drives a transmission to produce a reciprocating movement in a shaft to which is coupled a rod through which there will be produce the beating or vibration of the branches of the tree in question, is essentially characterized in that between the output shaft of the motor and the corresponding transmission system, formed by a pulley and V-belt, a centrifugal clutch has been provided, while at the output of said transmission device the corresponding reducing gear has been provided whose output shaft is disposed vertically to articulate thereon a crank of variable radius on whose other end there articulates a correcting rod which is hinged by its free end to the corresponding shaft that receives the reciprocating movement, to which shaft is coupled in turn axially a rod through which the branches of the true are beaten; the provision having been made that the articulation between the connecting rod and the shaft subjected to reciprocating movement is materialized by a ball and socket between which and the corresponding retention bolt thereof a needle cage has been provided, said socket being disposed at a forked end belonging to the shaft intended to receive said reciprocating movement; with the further particularity that the coupling between the latter and the rod occurs through a sleeve inserted between both parts, permitting the removal of that rod from the shaft; being characterized further in that on the free end of the rod there has been provided, removably, an element functioning as hook or grip for its adaptation to the branches of the trees, in order that the reciprocating movement transmitted to the rod will produce the oscillatory movement of the branches and consequently the detachment of the fruit.

4,873,821

APPARATUS AND PROCESS FOR FORMING ALTERNATE TWIST PLIED YARN

Donald E. Hallam; Peter Popper, both of Wilmington, Del.; Harold F. Staunton, Avondale, Pa.; Robert E. Taylor, Columbia, S.C., and Paul W. Yngve, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 181,847, Apr. 15, 1988, abandoned. This application Apr. 29, 1988, Ser. No. 188,559
Int. Cl.[4] D02G *3/28, 3/38*
U.S. Cl. 57—293 **19 Claims**



1. A process for forming alternate twist plied yarn from a plurality of strands comprising the steps of advancing the strands at a predetermined rate under tension in a path adjacent to each other, twisting the strands each the same in a first direction and rate as they advance along said path, plying said twisted strands, stopping the forward motion of said strands, bonding the ply twisted strands to form a bond, stopping the twisting of the strands, then repeating said steps while twisting said strands each the same in the opposite direction to form a ply reversal node adjacent the bond.

4,873,822

ENERGY PRODUCING INSTALLATION WITH INTERNAL COMBUSTION ENGINE AND TURBINE

Henry Benaroya, 41 Boulevard du Commandant Charcot, 92200 Neuilly sur Seine, France

PCT No. PCT/FR87/00270, § 371 Date Mar. 4, 1988, § 102(e) Date Mar. 4, 1988, PCT Pub. No. WO88/00279, PCT Pub. Date Jan. 14, 1988
PCT Filed Jul. 8, 1987, Ser. No. 171,428
Claims priority, application France, Jul. 9, 1986, 86 10015
Int. Cl.[4] F02C *3/00*
U.S. Cl. 60—39.75 **7 Claims**

1. Energy producing installation comprising:

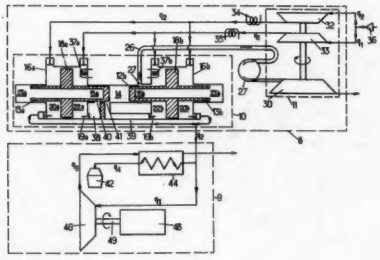
a compression unit including

at least one Diesel cycle free piston module, having two rectilinearly movable assemblies each formed of a Diesel piston and a compressor piston, the compressor pistons each defining two compressor compartments and said compressor compartments consisting of internal primary compartments and external secondary compartments, and the Diesel pistons defining a Diesel chamber, and

turboblower means for supercharging said module, having an expansion turbine fed with the exhaust gases of the Diesel chamber, a primary rotary compressor driven by said expansion turbine, connected to receive atmo-

spheric air and to deliver a primary air flow to said internal primary compartments and a secondary rotary compressor connected to receive atmospheric air and to deliver a secondary air flow to said external secondary compartments, and

a power unit including



combustion chamber means having an air inlet connected to receive part at least of the secondary air flow from said external compartments, and

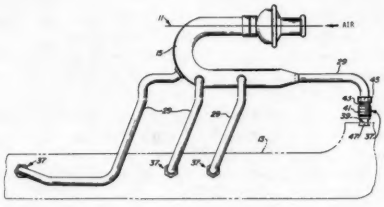
turbine means having a rotary power shaft delivering the output power of said installation and having an input connected to receive combustion gases from said combustion chamber.

4,873,823

AIR INJECTION PIPE ASSEMBLY AND METHOD OF MAKING

Gary Curths, Grand Rapids, Mich., assignor to McInerney Incorporated, Grand Rapids, Mich.

Filed Apr. 3, 1989, Ser. No. 332,603
Int. Cl.[4] F01M *3/30*
U.S. Cl. 60—293 **9 Claims**



1. An air injection pipe assembly adapted for delivering atmospheric air to and along the length of the exhaust manifold of a vehicle engine comprising:

a manifold air tube spaced from said exhaust manifold, having an inlet at one end and an outlet at its other end;

a plurality of spaced lateral outlets along the length of said manifold air tube intermediate its ends;

an air inlet valve having an outlet pipe snugly projected into the inlet of said manifold air tube;

means securing said air valve outlet to said manifold air tube inlet;

a plurality of irregularly shaped air injection tubes, at their one ends projected into said manifold air tube lateral outlets and into the manifold air tube outlet respectively;

an annular braze securing and sealing said one ends respectively of said air injection tubes to said manifold air tube; and

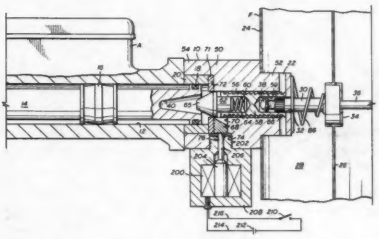
a flare fitting upon the other end of the air injection tubes adapted for projection into spaced openings in said exhaust manifold and secured and sealed to said exhaust manifold.

4,873,824

MASTER CYLINDER PRESSURE-RETAINING VEHICULAR ANTI-THEFT BRAKE LOCKING MECHANISM

Terry L. Cox, 2608 Wheaton No. 103, Houston, Tex. 77082

Filed Feb. 12, 1987, Ser. No. 13,953
Int. Cl.[4] F15B *15/26*
U.S. Cl. 60—545 **19 Claims**



12. A brake locking mechanism for use with a hydraulic vehicle brake system having a master cylinder with a piston reciprocable between a brake applying position in which a hydraulic fluid is compressed and a brake releasing position in which the hydraulic fluid is depressurized, and an actuator rod in an actuator housing for reciprocating the piston operable by a driver of the vehicle, comprising:

(a) a lock housing having first and second ends adapted to register with the actuator housing and master cylinder, respectively, to fit securely therebetween;

(b) a longitudinal bore formed through the lock housing;

(c) a ratcheted rod slideable in the longitudinal bore and adapted to reciprocate the piston responsively to urging of the actuator rod;

(d) a pawl concealed within said lock housing and positioned adjacent the longitudinal bore to releasably engage the ratcheted rod; and

(e) remotely operable means for engaging the pawl with the ratcheted rod with the ratcheted rod positioned to engage the piston in the brake applying position, thereby rendering release of the piston nonresponsive to the actuator rod, and for disengaging the pawl from the ratcheted rod, thereby returning the brake system to normal operation.

4,873,825

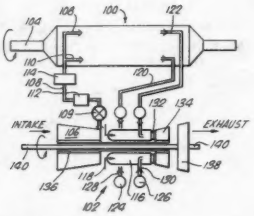
POSITIVE DISPLACEMENT ENGINE COMPOUNDED WITH A GAS TURBINE ENGINE

John A. Jenes, 7 Hollies Close, Newton Solney, Burton-on-Trent, Staffordshire, DE15 OSB, England

PCT No. PCT/GB87/00024, § 371 Date Sep. 15, 1987, § 102(e) Date Sep. 15, 1987, PCT Pub. No. WO87/04492, PCT Pub. Date Jul. 30, 1987
PCT Filed Jan. 16, 1987, Ser. No. 101,300
Claims priority, application United Kingdom, Jan. 16, 1986, 86 01065
Int. Cl.[4] F02B *37/00, 41/10*
U.S. Cl. 60—606 **10 Claims**

1. A prime mover comprising a positive displacement engine compounded with a gas turbine engine, the prime mover having power outputs comprising a low speed output from said positive displacement engine and a high speed output from said gas turbine engine, said gas turbine engine having combustion chamber means, a turbocompressor and a turbine, said prime mover having turbocharging air delivery means for delivering turbocharging air from the said turbocompressor to said positive displacement engine and combustion gas exhaust means

for exhausting combustion gases from the positive displacement engine to the turbine for driving the turbocompressor, said positive displacement engine having a compression ratio which is substantially less than its expansion ratio, whereby the



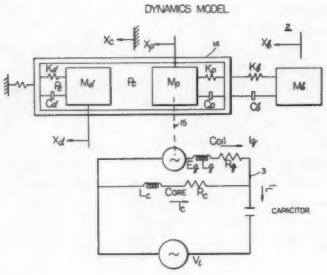
turbocharging air is delivered to the positive displacement engine at a first high pressure and the combustion gases are exhausted to the turbine at a second pressure lower than said first high pressure, said compression ratio being approximately half the expansion ratio of said positive displacement engine.

4,873,826

CONTROL SCHEME FOR POWER MODULATION OF A FREE PISTON STIRLING ENGINE

Manmohan Dhar, Schenectady, N.Y., assignor to Mechanical Technology Incorporated, Latham, N.Y.

Filed Dec. 28, 1988, Ser. No. 291,190
Int. Cl.[4] F02G *1/04*
U.S. Cl. 60—641.14 **9 Claims**



1. A control system for power modulation of a free piston Stirling engine, comprising:

a receiver adapted to absorb solar energy and to convert said solar energy into thermal energy;

a power module comprising a displacer type free piston Stirling engine having power and displacer pistons, and a linear alternator connected to said engine, said power module adapted to receive and to convert said thermal energy into electrical energy;

a utility grid adapted to receive the electrical energy from said power module;

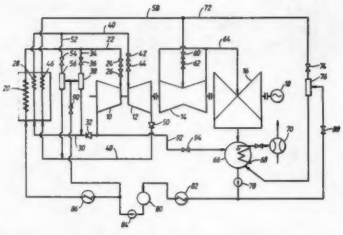
an autotransformer connected in series between said linear alternator and said grid, said autotransformer being connected by feedback means to said receiver so that a change in solar insolation to the receiver varies the autotransformer turns ratio thus changing said linear alternator's terminal voltage and changing power piston and displacer piston amplitude accordingly to maintain a high engine efficiency cycle over a large operating range for solar insolation absorbed by said receiver.

4,873,827

STEAM TURBINE PLANT

Yoshikazu Hadano; Eiji Tsunoda, both of Kanagawa, and Ichiro Kajigaya, Chiba, all of Japan, assignors to Electric Power Research Institute, Palo Alto, Calif.

Filed Sep. 30, 1988, Ser. No. 251,177
Claims priority, application Japan, Sep. 30, 1987, 62-244037; Sep. 30, 1987, 62-244038; Sep. 30, 1987, 62-244039
Int. Cl.[4] F01K *13/02*
U.S. Cl. 60—646 **19 Claims**



1. A steam turbine plant comprising:

(a) first, second and third turbines which are coaxially combined with each other;

(b) a boiler for supplying high pressure steam to the first turbine;

(c) first, second and third bypass means for selectively bypassing steam around the first, second and third turbines, respectively, wherein each of said bypass means comprises means for cooling the steam;

(d) a condenser for condensing steam discharged from the third turbine;

(e) means for forming a vacuum in the condenser;

(f) a first reheater for reheating steam discharged from the first turbine and from the first bypass means and for supplying the steam to the second turbine;

(g) a second reheater for reheating steam discharged from the second turbine and from the second bypass means and for supplying the steam to the third turbine;

(h) first, second and third control valves for controlling steam flow rates flowing into the first, second and third turbines, respectively;

(i) first, second and third bypass valves for controlling flow rates in said first, second and third bypass means, respectively; and

(j) means for selectively forming a vacuum in at least one of the first and second turbines.

4,873,828

ENERGY STORAGE FOR OFF PEAK ELECTRICITY

Oliver Laing, and Johannes L. N. Laing, both of 4461 Ocean Blvd., Apt. 54, San Diego, Calif. 92019

Continuation-in-part of Ser. No. 611,464, May 17, 1984, Pat. No. 4,710,100. This application Mar. 31, 1986, Ser. No. 846,338
Claims priority, application Switzerland, Nov. 21, 1983, 6242/83
Int. Cl.[4] F01K *27/00*
U.S. Cl. 60—659 **2 Claims**

1. A storage vessel for gaseous fluids submerged into a body of water resting over a floor, said vessel having a vertically aligned cylindrical wall portion, a circular cross-section in a horizontal plane and two end portions;

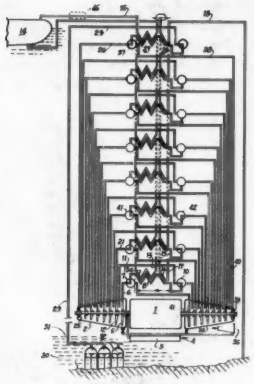
the specific density of the storage vessel being different from that of the water body;

ropes connected to the end portions of the cylinder;

said ropes being uniformly distributed over the circumference of the vessel, surrounding said vessel's cylindrical wall portion and transmitting the forces caused by the

difference in density to a system with an invariable geodetical level formed by the surface of the floor;

wherein the shape of the storage vessel is defined by a geometric body of rotation and a semispherical upper end portion above the cylindrical wall portion;



the skin of the storage vessel is made of plastic foil, said ropes are attached to its upper end portion and run downwardly; and

the lower part of the cylindrical wall portion turns inward like a rolling membrane and rises toward the upper end portion of the storage vessel as the mass of fluid in the storage vessel decreases.

4,873,829

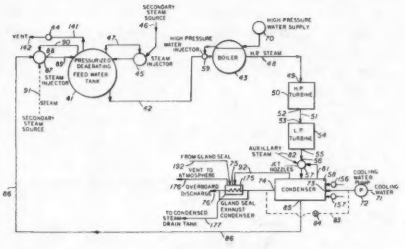
STEAM POWER PLANT

Anthony R. Williamson, 4267 Bethel Blvd., Houston, Tex. 77092

Filed Aug. 29, 1988, Ser. No. 237,086

Int. Cl.[4] F01K *13/00*

U.S. Cl. 60—670 **31 Claims**



1. A steam power plant comprising, in combination deaerating feed water tank,

a high-pressure steam boiler,

a high-pressure steam turbine,

a low-pressure steam turbine, and

a water-cooled, steam condenser, connected in series in a closed circuit,

said condenser being maintained under a substantial pressure during operation, and being connected to supply feed water to said feed water tank,

means connected to said to separate and remove air from the water in said feed water tank,

steam jet means connected between and operable to move steam from said low-pressure turbine to said condenser,

high-pressure, water injection means connected between and operable to move water from said feed water tank to said boiler, and

steam jet pump means connected between and operable to move water condensate from said condenser to said feed water tank.

4,873,830

ELECTRICALLY CONTROLLED PLUMBING FIXTURE OF A HOT AND COLD WATER DISPENSER

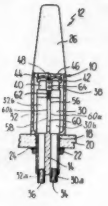
Ernst Blättler, Obfelden, Switzerland, assignor to KWC AG, Unterkulm, Switzerland

Filed Sep. 16, 1988, Ser. No. 245,287

Claims priority, application Switzerland, Sep. 22, 1987, 03658/87

Int. Cl.[4] F25B *21/02*

U.S. Cl. 62—3.3 **9 Claims**



1. A plumbing fixture for dispensing a mixture of hot and cold water comprising: a first conduit for connection to a supply of hot water, a second conduit for connection to a supply of cold water, valve means connected to the first and second conduits for controlling the flow of water therethrough, a nozzle connected to the valve means for dispensing water passing through the valve means, electronic control means connected to the valve means for controlling the operation of the valve means, and a power source for providing electrical power to operate the electronic control means, the electrical power source comprising: a Peltier arrangement having a first side, a second side and an electrical output, means for thermally coupling the first side of the Peltier arrangement to the first conduit, means for thermally coupling to the second side of the Peltier arrangement to the second conduit, at least one of the means of thermally coupling a side of the Peltier arrangement to one of the conduits including means for storing heat, and means for connecting the electrical output of the Peltier arrangement to the electronic control means.

4,873,831

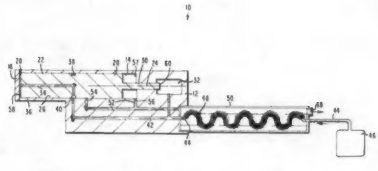
CRYOGENIC REFRIGERATOR EMPLOYING COUNTERFLOW PASSAGEWAYS

Axel G. Dehne, Palos Verdes, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 27, 1989, Ser. No. 329,043

Int. Cl.[4] F25B *9/00*

U.S. Cl. 62—6 **13 Claims**



1. A cryogenic refrigerator comprising:

a fluid-tight housing;

a cylindrically-shaped piston freely mounted in said fluid-tight housing and separating said housing into a variable cold volume and a constant pressure chamber, the area of said piston facing said variable cold volume being greater than the area of said piston facing said constant pressure chamber, said piston having a fluid passageway therein extending from said variable cold volume to a location along its radial surface;

gas supply means for supplying high pressure gas to said variable cold volume when said variable cold volume is substantially at its minimum volume and for supplying high pressure gas to said constant pressure chamber;

gas exhaust means for venting cold gas from said variable cold volume when said variable cold volume is substantially at its maximum volume; and

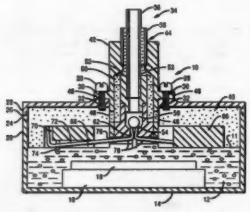
heat exchanger means thermally coupled to said gas supply means in the vicinity of said gas exhaust means for exchanging heat therebetween and to the surrounding environment.

4,873,832

LIQUID LEVEL CONTROL FOR A CRYOGENIC FLUID

Warren W. Porter, Escondido, Calif., assignor to NCR Corporation, Dayton, Ohio

Filed Dec. 8, 1988, Ser. No. 281,310
Int. Cl.[4] F17C *13/02*
U.S. Cl. 62—49.2 **12 Claims**



3. An apparatus for controlling a cryogenic fluid level, comprising:

a valve housing having a lower portion which serves as a datum for the cryogenic fluid level;

float means for mechanically indicating the cryogenic fluid level relative to the datum;

said float means has a disk shape with an axially symmetric aperture therein;

actuator means connected to the float means for providing a mechanical force and displacement that are functions of a difference between the cryogenic fluid level and the datum; and

valve means located within the valve housing responsive to said actuator means for controlling a flow of a cryogenic fluid from an input to an output thereof to reduce the difference between the cryogenic fluid level and the datum.

4,873,833

APPARATUS COMPRISING A HIGH-VACUUM CHAMBER

Loren N. Pfeiffer, Harding Township, Morris County, and Kenneth W. West, Mendham Township, Morris County, both of N.J., assignors to American Telephone Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Nov. 23, 1988, Ser. No. 276,082
Int. Cl.[4] B01D *8/00*
U.S. Cl. 62—55.5 **8 Claims**

8. Apparatus comprising an evacuable chamber and at least one cryopump for removing gas from the chamber, the cryopump comprising a mounting flange and a primary pumping stage, the primary pumping stage further comprising a primary condensor array,

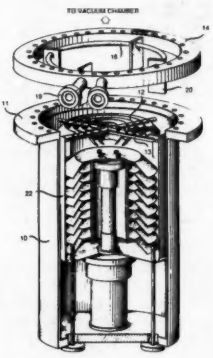
characterized in that

the apparatus further comprises:

(a) a mounting ring having first and second faces, the first face being adapted for sealingly attaching to the mounting flange of the cryopump and the second face being adapted for sealingly attaching to the evacuable chamber;

(b) a copper tube for conducting liquid nitrogen adjacent the primary condensor array, the copper tube having first and second ends and being configured substantially in the shape of a ring;

(c) at least one low-temperature valve for controlling the flow of liquid nitrogen through the copper tube;



(d) at least one purge valve for controlling the flow of purge gas for expelling residual liquid nitrogen from the copper tube;

(e) at least one copper mounting block mounted to the copper tube and to the primary condensor array for thermally conductively attaching the copper tube to the primary condensor array;

(f) a conduit for conducting liquid nitrogen from the low-temperature valve and purge gas from the purge valve through the mounting ring to the first end of the copper tube; and

(g) a conduit for conducting liquid nitrogen and purge gas from the second end of the copper tube through the mounting ring.

4,873,834

COOLING PLANT LOAD REDUCTION APPARATUS AND METHOD

Doyle W. Cox, 309 Council Rd., Georgetown, Tex. 78628

Filed Apr. 11, 1988, Ser. No. 180,205
Int. Cl.[4] F25B *9/00*
U.S. Cl. 62—87 **9 Claims**

1. A cooling plant load reduction apparatus comprising:

A. a blower means for collection and direction of heated air from within a structure;

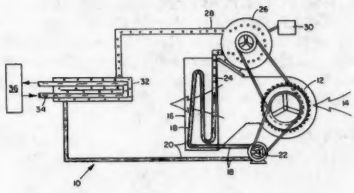
B. an expansion means, containing a coolant means, located in the path of said heated air directed from said blower means whereby said coolant absorbs heat from said heated air and air leaving said expansion means is cooler than said heated air entering;

C. a turbine means, mechanically connected to said blower means and a pump means, connected to said expansion means so that said coolant means, heated by said heated air, is passed through said turbine means;

D. a generator means connected to said turbine means so

that as said coolant means passed through said turbine means said generator produces electricity;

E. a condenser means which collect and cools said coolant means from said turbine means; and



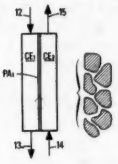
F. said pump means for directing said coolant means from said condenser means to said expansion means under pressure so that heat and electrical loads within said structure are reduced.

4,873,835

PROCESS FOR THE SIMULTANEOUS EXCHANGE OF HEAT AND MATTER THROUGH A POROUS WALL

Alexandre Rojey, Garches, and Alain Grehier, Paris, both of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Jan. 12, 1988, Ser. No. 143,097
Claims priority, application France, Jan. 13, 1987, 87 00359
Int. Cl.[4] B01D *53/22*
U.S. Cl. 62—93 **20 Claims**



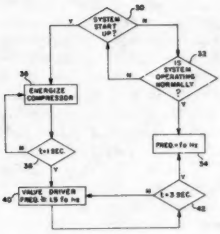
1. Process for the simultaneous transfer of heat and matter from a relatively hot gaseous phase (I) to a relatively cold gaseous phase (II), the relatively hot gaseous phase (I) comprising at least two constituents A and B having different condensation temperatures, the condensation temperature of A being lower than the condensation temperature of B and at least the constituent B being at least in part condensable under the conditions of the process, said process comprising circulating the gaseous phase (I) in contact with the first face of an exchange wall permeable to at least the constituent B in the liquid state and circulating the gaseous phase (II) in contact wiht the second face of the porous exchange wall, in a direction substantially parallel and opposite that of the flow of the gaseous phase (I), the temperature of the gaseous phase (II) at the beginning of the contact being sufficiently low to permit the condensation of at least a fraction of the constituent B of the gaseous phase (I) and the maintenance of the resulting condensate in at least a part of the thickness of the porous portion of the exchange wall, the temperature of the gaseous phase (II) not however being too low to avoid total condensation of the constituents A and B of said gaseous phase (I) in the course of said contact, the conditions of pressure on each side of the wall being mutually adapted to permit said condensation of a fraction of the constituent B on the said first face and the vaporisation of said condensed fraction on said second face, and withdrawing separately the gaseous phase (I) of lowered temperature, of lowered concentration of constituent B and of increased concentration of constituent A and the gaseous phase (II) of increased temperature and increased concentration of constituent B.

4,873,836

FLOW NOISE SUPPRESSION FOR ELECTRONIC VALVES

Michael B. Thompson, Hoffman Estates, Ill., assignor to Eaton Corporation, Cleveland, Ohio

Filed Jun. 6, 1988, Ser. No. 202,638
Int. Cl.[4] F25B *41/04*
U.S. Cl. 62—158 **4 Claims**



1. A method of controlling refrigerant flow in a refrigeration system of the type having a compressor electrically energized for pumping refrigerant in a closed loop through an exothermic heat exchanger for condensing, through an electrically operated expansion valve for expansion and through an endothermic heat exchanger for cooling a compartment and returning to the compressor comprising the steps of:

(a) initially energizing the compressor and pulsing said valve at a relatively high initial frequency;

(b) maintaining said relatively high frequency pulsing for a predetermined time interval; and,

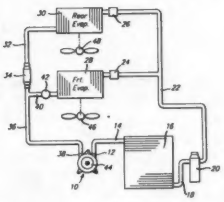
(c) decreasing the frequency of said pulsing to a level less than two-thirds of said initial frequency.

4,873,837

DUAL EVAPORATOR AIR CONDITIONER

Theodore L. Murray, Xenia, Ohio, assignor to Chrysler Motors Corporation, Highland Park, Mich.

Filed Oct. 3, 1988, Ser. No. 252,474
Int. Cl.[4] F25B *5/00*
U.S. Cl. 62—199 **2 Claims**



1. In an automobile having an interior with forward and rearward portions to be cooled, an improved air conditioner including two evaporators for cooling, the evaporators being widely spaced from one another, one being located in the forward portion of the interior and one being located in the rearward portion of the interior to selectively permit either simultaneous or separate cooling of the forward and rearward portions; a refrigerant compressor for pumping refrigerant to the two evaporators, the compressor being located near the

forward evaporator and widely spaced from the rearward evaporator; each evaporator having a selectively energized fan mean which passes air over the evaporator's outer cooling surface respectively; an elongated suction conduit which extends longitudinally of the automobile from the rear evaporator to the compressor for returning refrigerant thereto; a relatively short conduit extending from the forward evaporator to the suction conduit and interconnected thereto for the return to the compressor of refrigerant discharged from the forward evaporator; control means to alternately activate and deactivate the compressor in response to the refrigerant pressure discharged from the forward evaporator for the purpose of maintaining the related temperature of the outer surface of the forward evaporator above a frost producing low temperature and below a noticeably uncomfortable high temperature in the forward portion of the automobile interior, the low temperature related indicator initiating compressor deactivation and the higher temperature related indicator initiating compressor activation; a one-way refrigerant flow check valve in flow control relation to the rear evaporator suction conduit for allowing only a flow from the rear evaporator to the compressor, the check valve being positioned just upstream from where the short conduit leading from the forward evaporator connects to the rear suction conduit so that refrigerant which is discharged from the forward evaporator is prohibited from flowing to the rearward evaporator whereby such reverse flow would otherwise occur whenever the rear fan means is inactive and the compressor is deactivated causing an undesirable decrease in the refrigerant pressure which the compressor control would falsely interpret and thus delay the reactivation of the compressor resulting in a blast of higher temperature air from the forward evaporator than is desired.

4,873,838

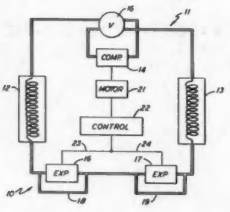
REFRIGERANT METERING IN A VARIABLE FLOW SYSTEM

Roger J. Voorhis, Liverpool, and John M. Palmer, Syracuse, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Continuation of Ser. No. 925,758, Oct. 31, 1986, abandoned. This application Mar. 28, 1988, Ser. No. 137,009

Int. Cl.[4] F25B *41/00*

U.S. Cl. 62—207 **11 Claims**



1. In a refrigeration system of the type having a compressor driven by a variable speed motor and a heat exchanger coil for transferring heat to a contained refrigerant, an improved expansion device and control comprising:

a motor control means responsive to sensed conditions for controlling the speed of the variable speed motor by way of a command speed signal;

an orifice for conducting refrigerant to the evaporator coils said orifice acting as a throttle to expand the refrigerant from a liquid to a gaseous state;

a piston associated with said orifice and selectively movable between a closed position to block the flow of refrigerant through said orifice and an opened position to expose said orifice to the free flow of refrigerant therethrough; and

valve control means responsive to said command speed signal for selectively causing the piston to alternate between the open and closed positions with the ratios of open to closed time being controlled to selectively regulate the resultant flow volume to a rate which is substantially proportional to said command speed when the compressor is being driven above a predetermined speed.

4,873,839

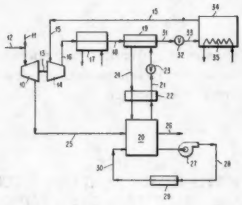
COMBUSTION-POWERED COMPOUND REFRIGERATION SYSTEM

Daniel J. Dessanti, Brooklyn, and Hans P. Schorr, Douglaston, both of N.Y., assignors to The Brooklyn Union Gas Company, Brooklyn, N.Y.

Filed Oct. 11, 1988, Ser. No. 255,436

Int. Cl.[4] F25B *27/00*

U.S. Cl. 62—238.6 **14 Claims**



1. An improved refrigeration system comprising a refrigerant vapor compressor driven by a prime mover powered by the combustion of a fluid fuel, a condenser connected to said compressor to condense the hot compressed refrigerant vapor, a heat exchanger connected to receive the condensed refrigerant and to effect subcooling thereof, a pressure-reducing valve connected for the expansion of the subcooled refrigerant and for the discharge of the expanded refrigerant into an evaporator equipped with heat transfer surface for the recovery of refrigeration from said evaporator by a fluid passed in contact with said heat transfer surface, said evaporator being connected to pass refrigerant vapor therefrom back to said compressor, and an ammonia absorption refrigeration unit connected to utilize waste heat of the hot exhaust gases from said prime mover and further connected to pass liquid ammonia through an ammonia subcooler, said subcooler being connected for the flow of subcooled liquid ammonia through a pressure-reducing valve to said heat exchanger to effect said subcooling of said condensed refrigerant by evaporation of said liquid ammonia, said heat exchanger being connected for the return of ammonia vapor through said subcooler to said absorption refrigeration unit.

4,873,840

ENERGY CO-GENERATION SYSTEM

Rolf Gilliusson, Sollentuna, Sweden, assignor to SwedSteam AB, Danderyd, Sweden

Filed Feb. 11, 1988, Ser. No. 155,161

Int. Cl.[4] F25B *27/00*

U.S. Cl. 62—238.6 **19 Claims**

1. A co-generation system for producing electricity, heating and cooling, the co-generation system comprising:

a combustion unit;

a boiler operably connected to the combustion unit and adapted to produce steam;

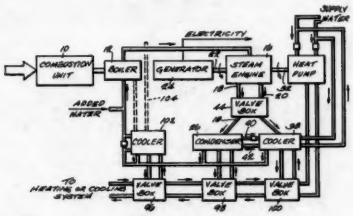
steam engine including at least one cylinder having a steam inlet port and a steam exhaust port, an output shaft, and a reciprocating piston housed in the cylinder and connected to the output shaft for rotatably driving the output shaft;

means for supplying steam from the boiler to the steam inlet port of the steam engine;

an electrical generator selectively operably connected to the output shaft of the steam engine so as to be selectively

driven by the steam engine for the production of electricity;

condenser means selectively operably connected to the exhaust port of the steam engine, the condenser means including means for supplying heat to a heat system and



means for causing condensation of the steam discharged by the exhaust port; and

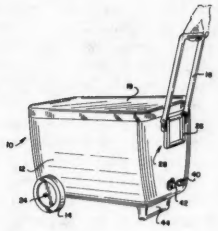
an absorption cooler means selectively operably connected to the exhaust port of the steam engine, the absorption cooler means including means for cooling fluid of a cooling system.

4,873,841

PORTABLE COOLER

William Bradshaw, 9144 S. Massasoit, Oak Lawn, Ill. 60453, and Robert Shepard, 6101 LaGrande, Oak Forest, Ill. 60452

Filed Apr. 3, 1989, Ser. No. 331,796
Int. Cl.[4] B60H *1/32*
U.S. Cl. 62—239 **15 Claims**



1. A portable cooler comprising:

a cooling compartment;

an axle positioned through the lower portion of one end of the cooling compartment and extending beyond the sides of the cooling compartment;

a pair of wheels, one of which is coupled to each end of the axle;

a wheel nut coupled to the end of axle securing said wheels to the axle;

a pair of handle support structures coupled to opposite sides of the cooler compartment each support structure having a handle support axle;

a lifting handle coupled to the handle support axle of each handle support structure enabling the cooler to be easily lifted to and from a vehicle; and

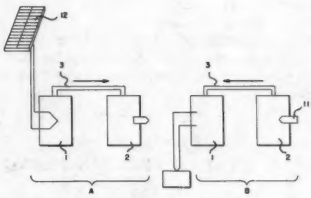
a pulling handle coupled to one of the handle support axles wherein said pulling handle being easily rotated about the handle axle enabling a user to easily and comfortably pull the portable cooler.

4,873,842

THREE-PHASE HEAT PUMP

Didier Payre; Georges Crozat, both of Perpignan, and Bernard Spinner, Corneilla Del Vercol, all of France, assignors to Societe Nationale Elf Aquitaine, Paris La Defense, France

Continuation-in-part of Ser. No. 623,964, Jun. 25, 1984, abandoned. This application Jul. 28, 1987, Ser. No. 78,591
Claims priority, application France, Jul. 1, 1983, 83 10955
Int. Cl.[4] F25B *17/08*
U.S. Cl. 62—480 **12 Claims**



1. A thermochemical heat pump which comprises:

a first reactor, a liquid in equilibrium with its vapor phase in said first reactor, wherein the gas produced by the first reactor is water vapor,

a second reactor, a reaction medium in said second reactor, comprising a two-phase medium wherein the two-phase medium is selected from the group consisting of (1) a solid and a liquid solution saturated with a said solid, wherein the solid in the second reactor, is selected from (a) halides of the group consisting of $CaCl_2$-(6-2)H_2O, $CaCl_2$-(2-1)H_2O and $CaCl_2$-(1-0)H_2O and (b) compounds selected from the group of chlorides, bromides, iodides or fluorides of alkaline metals or alkaline earth metals, said compounds undergoing dehydration-rehydration in a reversible manner and (2) two-non-miscible liquids,

a conduit connecting said first reactor and said second reactor so as to form a monovariant three-phase system, and

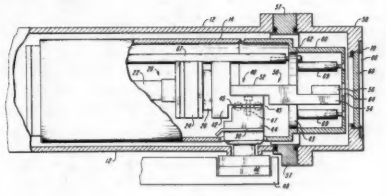
whereby an exchange of calories takes place between said first and second reactors by means of a monovariant reaction between the vapor of said reactor and the liquid phase of said second reactor.

4,873,843

MULTIPLE SOURCE AND/OR SENSOR COLDHEAD MOUNT

Curt V. Volten, Chestnut Hill, Mass., assignor to Spectra-Physics, Inc., San Jose, Calif.

Filed Jul. 18, 1988, Ser. No. 220,269
Int. Cl.[4] F25B *19/00*
U.S. Cl. 62—51.1 **19 Claims**



1. A refrigerator environment for multiple laser sources and/or sensors comprising:

a vacuum housing comprising:

a first housing portion;

a separate second housing portion longitudinally extending from said first housing portion; and
a window opening at the end of said second housing portion to permit the passage of laser light;
a cold-shield within said vacuum housing comprising:
a first cold-shield portion;
a second cold-shield portion longitudinally extending from said second cold-shield portion; and
an aperture at the end of said second cold-shield portion to permit the passage of laser light;
a cold-finger within said cold-shield thermally coupled to a cryogenic refrigerator; and
a mounting station assembly comprising:
an insulating stand-off assembly;
a mount mechanically coupled to said stand-off assembly and thermally coupled to said cold-finger; and
a cold-head assembly support thermally and mechanically coupled to said mount.

4,873,844

METHOD AND APPARATUS FOR THE PRODUCTION OF TEXTILE STRIP

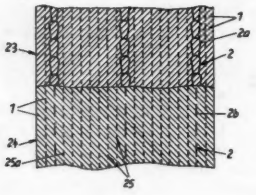
Bertram Frenzel; Dietmar Grenzendorfer; Heinz Kemter; Wolfgang Wünsch, and Peter Zeisberg, all of Karl-Marx-Stadt, German Democratic Rep., assignors to VEB Kombinat Textima, Karl-Marx-Stadt, German Democratic Rep.

Continuation of Ser. No. 559,116, Dec. 7, 1983, abandoned. This application Feb. 12, 1987, Ser. No. 14,152

Claims priority, application German Democratic Rep., Feb. 28, 1983, 2483026

Int. Cl.[4] D04B *23/06*

U.S. Cl. 66—84 A **20 Claims**



1. A warp knitting machine, and especially a sewing-knitting machine,for producing a warp-knit fabric having endless oblique and diagonal filling threads, comprising

a pair of spaced-apart parallel chain conveyors for transporting a plurality of filling-thread sections to a stitch-forming site of the machine;

a plurality of hooks carried on each chain conveyor for holding a plurality of filling thread sections between said chain conveyors, each filling thread section being defined by a section of filling thread extending from a hook holding the filling thread section on one of said chain conveyors to a hook holding the filling thread section on the other of said chain conveyors;

means for laying filling thread sections in said hooks between said chain conveyors, said means for laying comprising a first filling laying device for laying filling thread sections, said first filling laying device being movable back and forth between said chain conveyors obliquely and diagonally with respect to the direction of transportation of said chain conveyors for inserting the endless filling threads forming the filling thread sections onto the hooks of said chain conveyors at an oblique and diagonal angle to the direction of transportation of said chain conveyors, said first filling laying device including means for guiding the endless filling threads from said first filling laying device onto said hooks;

means for controlling movement of said filling thread laying means relative to movement of said chain conveyors so that each respective hook holding a respective filling thread section on one of the chain conveyors is longitudinally displaced with respect to the chain conveyors from the hook on the other chain conveyor also holding that filling thread section; and

means for combining the endless filling threads of filling thread sections inserted on the hooks of said chain conveyors by warp-knitted stitches,

thereby to produce said fabric having endless oblique and diagonal filling threads.

4,873,845

DEVICE FOR SUPPORTING THE THREAD GUIDE OF AN AUTOMATIC FLAT KNITTING MACHINE

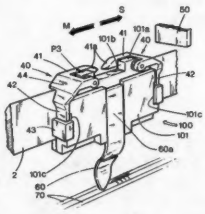
Benito Stoppazzini, Sala Bolognese, Italy, assignor to E.M.M. Emiliana Macchine Maglieria S.r.l., Padulle di Sala Bolognese, Italy

Filed Feb. 24, 1989, Ser. No. 314,974

Claims priority, application Italy, Mar. 1, 1988, 4750/88

Int. Cl.[4] D04B *15/52*

U.S. Cl. 66—126 R **3 Claims**



1. Improved device for supporting the thread guide of an automatic flat knitting machine, said machine comprising at least one bar, located parallel to and above needle beds of said machine, a carriage, able to move in a horizontal plane, and fitted with anchor plates, being able to move in a vertical plane, said anchor plates being able to strike against slides and draw along said slides in directions of movement of said carriage with said slides mounted so that they couple with said bar and can be drawn along a section of the said bar delimited by two consecutive stops fixed to the same bar, each of said slides comprising a body featuring: a horizontal groove in one face of said body and coupling in complementary fashion with said bar; a vertical groove on the opposite face of said body, designed to receive an upper portion of a thread guide, said thread guide extending towards said needle beds; a track formed by an upper rib of said body, said track featuring a ledge for each direction of movement of said carriage, said ledges being designed to be struck by said anchor plate, in a lowered position, for said slide to be drawn along, with said slide comprising: two rockers, mounted so that they pivot on said body, in a symmetrical position in relation to a plane perpendicular to said bar, each of said rockers working in conjunction with one of said ledges and comprising two arms, first and second respectively, with said first arm extending beside said track, beyond a corresponding ledge towards the centre of said body, and with said second arm extending downwards by a side of said body, with said rocker able to rotate through a predetermined angle around the axis of said pivot, from a first position in which said first arm is aligned with said track, and said second arm is situated alongside said side to a second position in which said first arm is lowered and said second arm is moved away from said side, and viceversa; it being possible for said rotation to be alternatively free, actively effected or prevented, said rotation being free, from said first position to said second position, and effected in synchrony with the striking of said anchor plate first against said first arm and then against said ledge, said rotation being actively ef-

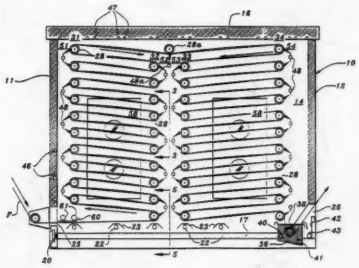
fected, from said second position to said first position, as a result of said second arm striking against one of said stops or against said second arm of a further identical slide, said rotation finally being prevented in said first position as a result of said slide itself being in a stopped position with its said second arm stopped up against one of said stops or against said second arm of another slide.

4,873,846

TEXTILE STEAMING APPARATUS

James E. Talbert, Jr., Lancaster, S.C., assignor to Morrison Textile Machinery Company, Fort Lawn, S.C.

Filed Dec. 30, 1988, Ser. No. 292,415
Int. Cl.[4] D06B *3/12, 23/30*
U.S. Cl. 68—5 E **19 Claims**



1. A textile steamer for steaming a continuously advancing fabric and having provision for the rapid wash down of the interior components of the steamer between fabric steaming operations, said steaming comprising

an enclosed chamber,

means for introducing steam into said chamber,

at least two vertical rows of fabric guide rollers mounted in said housing, and with the rollers being disposed along parallel horizontal axes and such that a fabric may be threaded onto the rollers in a sinusoidal path to define generally horizontal runs of the fabric between the rollers, and

water spray means mounted within said chamber for directing a water spray onto the full length of each of said rollers to permit the rollers to be cleaned between fabric steaming operations, said water spray means comprising at least two vertical rows of water delivery pipes positioned parallel to and laterally outside of respective ones of said vertical rows of rollers, and nozzle means mounted on each of said pipes for directing the water spray onto the full length of at least one adjacent roller, and wherein any water dripping from the water delivery pipes or nozzle means during normal operation of the steamer will not fall upon said horizontal runs of fabric.

4,873,847

APPARATUS FOR DYEING A FABRIC MATERIAL

Tomoaki Kasai, Kurobe, and Seizo Sekiguchi, Uozu, both of Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan

Filed Oct. 25, 1988, Ser. No. 261,932
Claims priority, application Japan, Oct. 27, 1987, 62-269273
Int. Cl.[4] D06B *3/28*
U.S. Cl. 68—178 **9 Claims**

1. An apparatus for dyeing a fabric material which comprises:

(i) a substantially semicircular tubular vessel having at opposite ends thereof upwardly directed openings;

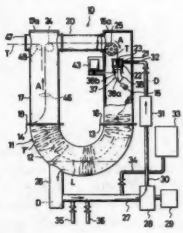
(ii) a first vertical conduit connected at one end to one of the openings in said vessel;

(iii) a second vertical conduit connected at one end to the other opening in said vessel;

(iv) a horizontal connecting conduit extending between and interconnecting said first and second vertical conduits at the respective upper ends thereof;

(v) a dye feed box having a jet nozzle and disposed in said first conduit;

(vi) a flow deflecting means rotatably mounted in said first



conduit and having a downwardly slanted portion to deflect the flow of fabric material and dye liquid at a predetermined angle with respect to the central vertical axis of said first conduit;

(vii) a dye recycle circuit for recycling the flow of dye liquid from said vessel to said first conduit; and

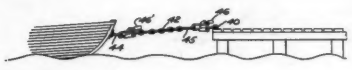
(viii) a fabric recycle circuit for recycling the fabric material through said first conduit, said vessel, said second conduit and said horizontal conduit.

4,873,848

LOCKING SYSTEM FOR SECURING VALUABLES

Henry W. Honeyman, III, 118 Peninsula Rd., Matunuck Point, Wakefield, R.I. 02879

Filed Jan. 30, 1989, Ser. No. 302,934
Int. Cl.[4] E05B *73/00*
U.S. Cl. 70—14 **6 Claims**



1. A device for securing valuable property such as a boat against unauthorized use comprising a hasp having a portion thereon bent into a U shape to form two legs, said hasp having at one end thereof an eye, the legs of the U shaped portion having slots passing completely therethrough and in substantial alignment, a latch lug pivoted to the body of the hasp to pass through the slots in the U-shaped portion of the hasp whereby the U-shaped portion of the hasp may engage chain links, loops of cable or the like to secure the property.

4,873,849

LOCK PROTECTOR

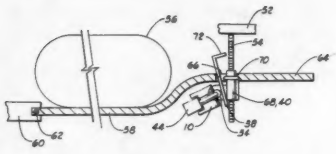
Thomas A. Goodson, 2717 Northwest 157th St., and Ronald D. Truelove, 2713 Northwest 157th St., both of Edmond, Okla. 73013

Continuation of Ser. No. 79,885, Jul. 30, 1987, Pat. No. 4,799,369. This application Jan. 23, 1989, Ser. No. 300,791
The portion of the term of this patent subsequent to Jan. 24, 2006, has been disclaimed.
Int. Cl.[4] E05B *67/38*
U.S. Cl. 70—54 **16 Claims**

1. A lock protector for a padlock, said lock protector comprising:

a pair of spaced body members adapted for receiving a shackle connected to said padlock therebetween, for pre-

venting tampering access to said shackle, said body members defining aligned transverse slots therethrough parallel to legs of said shackle and adapted for receiving a locking eye therethrough engagable by said shackle, said body members defining a planar surface positionable adja-



cent a body of said padlock when said padlock is in a locked position for preventing rotation of said padlock about said body members; and

a neck member integrally formed with said body members and extending between said body members and between said legs of said shackle.

4,873,850

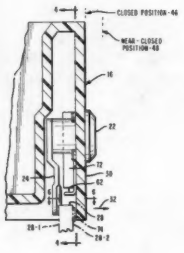
ANTI-JAMMING UP DEVICE FOR A DRAWER

Dale R. Lyons, and Don E. Beam, both of Cambridge, Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 19, 1988, Ser. No. 286,410

Int. Cl.[4] E05B *65/46*

U.S. Cl. 70—85 **6 Claims**



1. A drawer assembly comprising:

a frame;

a drawer having a front panel;

mounting means for mounting said drawer for movement between open and closed positions relative to said frame;

a key lock mounted in said drawer, with said key lock having a locking arm moveable between locking and unlocking positions by a key associated with said key lock;

said frame having an abutment member with said abutment member having a locking side and a non-locking side, said abutment member cooperating with said locking arm to lock said drawer in said closed position when said locking arm is moved to said locking position by said key to engage said locking side of said abutment member after said drawer is moved to said closed position;

a latching mechanism coupled between said drawer and said frame for latching said drawer in said closed position when said drawer is moved to said closed position and for unlatching said drawer permitting it to move towards said open position upon at least one predetermined event, with one said predetermined event being the movement of said locking arm from said locking position to said unlocking position; and

support means positioned between said front panel and said locking arm to provide support for said locking arm when said locking arm is inadvertently placed in said locking position prior to said drawer being moved to said closed position to thereby prevent bending of said locking arm when contacting said non-locking side of said abutment member and also to prevent said drawer from being moved close enough to said closed position which would cause said latching mechanism to latch said drawer to said frame.

4,873,851

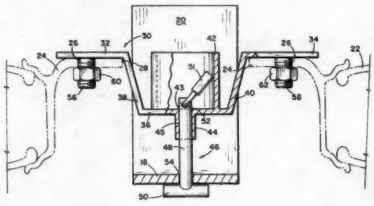
SPARE TIRE LOCK FOR TRUCK-TRAILER WHEELS

Daniel W. Arnett, 8206 N. 122nd E. Ave., Owasso, Okla. 74055

Filed Mar. 20, 1989, Ser. No. 325,951

Int. Cl.[4] E05B *65/12*

U.S. Cl. 70—259 **4 Claims**



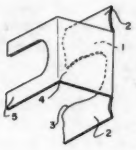
1. A spare tire locking device for truck-trailer wheels and the like vehicles and for use in association with a conventional tire carrier of the type having a first horizontal member whose length is at least equal to the maximum diameter of the wheel and tire to be supported thereon, the carrier having vertical side members extending upwardly from the ends of the first horizontal member and welded at their upper ends to the frame of the vehicle and the carrier having a second horizontal member attached to and extending from the center of the first horizontal member at right angles thereto, the length of the second horizontal member being such that a majority of the wheel and tire will be supported on the carrier with only a portion of the tire projecting outwardly therefrom, the second horizontal member being provided with a vertical side member connected to the outer end of the second horizontal member and being welded at its upper end to the frame of the vehicle; the spare tire locking device comprising a generally gull-shaped member having a pair of upper and outwardly extending horizontal arms adapted to overlie a rim portion only of the wheel, a lower flat central portion connecting with the inner ends of the horizontal arms through a pair of upright members, a stud projecting downwardly from each horizontal arm, the studs being receivable in diametrically opposite bolt holes in the rim for bolting the gull-shaped member against the rim with the central portion and upright member being received in a pre-existing central opening in the rim, a hollow cylinder attached to the upper surface of the flat central portion, a smaller cylindrical tube attached to the upperside of the flat central portion in concentric relation with the cylinder and communicating with the cylinder through a hole in the central portion, and a T-bar having a vertical portion adapted to pass first through a pre-bored hole in the conventional tire carrier on which the wheel is mounted with the gull-shaped member attached thereto, the T-bar being adapted to pass upwardly through the tube and into the interior of the cylinder, the T-bar having a horizontal handle connected to the lower end of the vertical portion and a hole at the upper end of the vertical portion for attachment of a padlock to the vertical portion when it projects upwardly into the cylinder.

4,873,852

FORK FOR THE FIXATION OF A CYLINDER LOCK PLUG

Guy Neyret, 11, rue du Fort, 69340 Francheville, France

Filed Oct. 31, 1988, Ser. No. 264,361
Claims priority, application France, Nov. 6, 1987, 87 15752
Int. Cl.[4] E05B *09/08*
U.S. Cl. 70—451 **10 Claims**



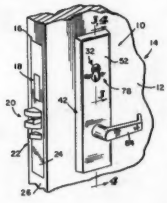
1. A fixation fork for a cylinder lock plug, provided for being placed underneath the head of the plug to maintain it flat against a fixation panel, characterized by the fact that it is fast with a second fork cooperating with the end of the plug which is opposite the head, one of said forks being provided with wings bearing on the fixation panel.

4,873,853

ESCUTCHEON ASSEMBLY

William R. Foshee, Noblesville, Ind., assignor to Best Lock Corporation, Indianapolis, Ind.

Filed Mar. 23, 1989, Ser. No. 328,105
Int. Cl.[4] E05B *15/02*
U.S. Cl. 70—452 **6 Claims**



1. An escutcheon for shielding a portion of a door panel or the like, the escutcheon comprising

a cover plate having outer and inner faces, the cover plate being formed to include an elongated lock cylinder-receiving cavity having an annular rear opening in the inner face and a figure-8-shaped front opening in the outer face.

4,873,854

COMPUTER CONTROLLED COILING MACHINE

Frank S. Russell, Northboro, and Timothy J. Hallihan, Charlton Depot, both of Mass., assignors to Sleeper & Hartley Corp., Worcester, Mass.

Filed Oct. 30, 1987, Ser. No. 116,068
Int. Cl.[4] B21F *3/04, 11/00*
U.S. Cl. 72—12 **46 Claims**

1. A wire coiling machine having a work station at which a coil spring is formed and comprised of:

a machine frame,

a pair of feed rollers supported in said machine frame adjacent said work station,

first motor means supported in said machine frame and selectively controlled to operate said feed rollers for directing wire to said work station for coiling,

a pitch tool,

means for operatively supporting said pitch tool at said work station,

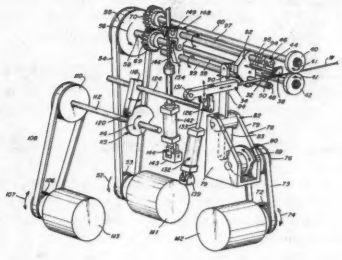
second motor means supported in said machine frame and selectively controlled to operate said pitch tool for controlling the pitch of the spring formed at said work station,

first intercoupling means comprising first cam means having a continuously variable diameter control surface providing a continuously variable diameter coupling between said second motor means and said pitch tool for effecting positional linear control of the pitch tool at the work station at various preselected positions corresponding to various pitches of the coil spring being formed, wherein increments in movement of said first cam means over a predetermined range thereof provide corresponding increments in movement of said pitch tool over a predetermined range thereof, said increments of said respective ranges being linearly interrelated to selectively control spring pitch as a linear function of first cam means position,

a diameter tool,

means for operating supporting said diameter tool at said work station,

third motor means supported in said machine frame and selectively controlled to operate said diameter tool for



controlling the diameter of the spring formed at said work station,

second intercoupling means comprising second cam means having a continuously variable diameter control surface providing a continuously variable diameter coupling between said third motor means and said diameter tool for effecting positional linear control of the diameter tool at the work station at various preselected positions corresponding to various diameters of the coil spring being formed, wherein increments in movement of said second cam means over a predetermined range thereof provide corresponding increments in movement of said diameter tool over a predetermined range thereof, said increments of said respective ranges being linearly interrelated to selectively control spring diameter as a linear function of second cam means position,

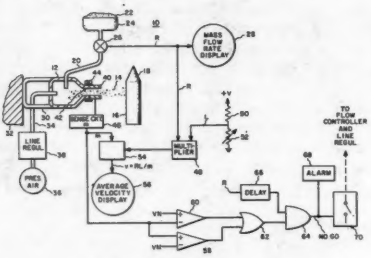
and computer control means including keyboard entry means for setting predetermined parameters regarding wire feed, spring pitch and spring diameter in constructing a predetermined spring,

said computer control means including means for providing three separate control signals corresponding respectively to and for operating said first, second and third motor means to thereby carry out the desired steps in forming said predetermined spring in accordance with said predetermined parameters set.

4,873,855
SHOT SENSING SHOT PEENING SYSTEM AND METHOD

Robert A. Thompson, New York, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed May 2, 1988, Ser. No. 188,828
Int. Cl.[4] B24C 7/00
U.S. Cl. 72—53 20 Claims



1. A shot peening system comprising:

a gun for shot peening, said gun having a nozzle with an outlet;

a first sensor in contact with said nozzle adjacent said nozzle outlet, said first sensor including a coil having an inductance which varies according to the amount of shot passing through said nozzle outlet;

first sensing circuit means connected to said coil for sensing the inductance of said coil and generating an amount signal representative of said amount of shot passing through said nozzle outlet;

a second sensor responsive to the amount of shot supplied to said gun;

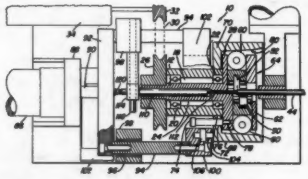
second sensing circuit means connected to said second sensor for generating a time-dependent signal corresponding to the amount of shot supplied to said gun during a unit period of time; and

calculation means for receiving as inputs said amount signal and said time-dependent signal and generating therefrom a velocity signal representative of the average velocity of shot leaving the gun.

4,873,856
KNURLING MACHINE AND THE LIKE

David E. King, Harrison, Tenn., assignor to C & D Engineering Company, Chattanooga, Tenn.

Filed Jun. 30, 1988, Ser. No. 213,362
Int. Cl.[4] B21H 7/14
U.S. Cl. 72—121 18 Claims

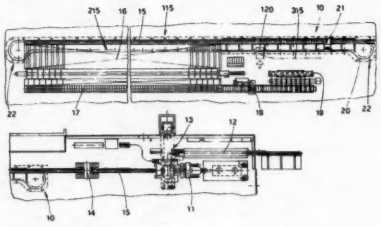


1. Apparatus for deforming a cylindrical surface of a workpiece comprising, a disk having a front face and an axial channel for receiving said workpiece secured in front of said front face, rotatable drive means for rotating said disk about an axis extending through said channel, a plurality of radial slots extending from said channel to the circumference of said disk, a slide member disposed in a respective slot so as to have a radially inward end and a radially outward end, a deforming tool in the form of a roller rotatably carried by each of said slide members at said radially inward end, each of said rollers having an axis of rotation substantially parallel to the axis of said channel, a cam follower carried by each slide member at the respective radially outward end and extending out of each respective slot, an annular shell disposed concentrically about said disk, said shell having an internal annular surface abutting said cam followers, means connecting said shell to said disk for rotation therewith and for axial movement relatively thereto, said internal surface being annularly inclined relative to said axis to define an annular cam having a varying diameter increasing from a first end toward a second end, and axial drive means for moving said shell axially relatively to said disk in the direction in which said diameter increases so that progressively smaller diameter portions of said internal surface abut said followers to move said deforming tools progressively closer toward said channel for progressively deforming said workpiece.

4,873,857
DEVICE TO DRAW EXTRUDED STOCK FOR AN EXTRUSION PRESS

Cristiani Giancarlo, Gorizia, Italy, assignor to Danieli & C. Officine Meccaniche SpA, Buttrio, Italy

Filed May 13, 1988, Ser. No. 193,524
Claims priority, application Italy, May 22, 1987, 83377 A/87
Int. Cl.[4] B21C 35/02
U.S. Cl. 72—257 16 Claims



1. Device to draw extruded stock for an extrusion press, in which downstream of an extrusion press (11) is a withdrawal track (15) cooperating with two carriages (21) bearing engagement vices (24), an endless runway (20) being comprised in coordination with the withdrawal track (15) and having one segment (115) parallel to the withdrawal track (15) and bearing the two carriages (21), the endless runway (20) including two straight segments (115-215) and two connecting bends (22), the device being characterized in that the endless runway (20) comprises at least one switch point (120) and a parking line (315) for the carriages (21).

4,873,858
MANUFACTURE OF WIRE BINDING ELEMENTS

Leonard W. N. Jones, Surrey, Great Britain, assignor to James Burn International Ltd., United Kingdom

Filed May 19, 1988, Ser. No. 196,365
Claims priority, application United Kingdom, May 22, 1987, 8712149
Int. Cl.[4] B21F 45/16
U.S. Cl. 72—312 5 Claims

1. A binding strip forming machine comprising

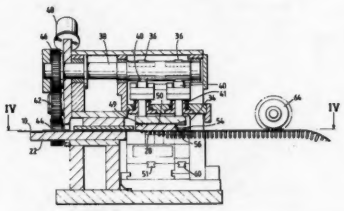
rotary feed means for feeding a multi-prong binding strip into a forming station in response to rotation of said feed means,

forming means located at said forming station for forming

successive prongs of said multi-prong binding strip into a desired configuration,

arresting means connected with said rotary feed means for arresting the feed of successive prongs in said forming station,

clamp means located at said forming station for clamping successive prongs in place at said forming station during forming thereof, and



rotary clamp actuation means connected between said rotary feed means and said clamp means, said clamp actuation means causing said clamp means to function in response to rotation of said clamp actuation means, said rotary feed means completing at least two revolutions for each revolution completed by said clamp actuation means.

4,873,859

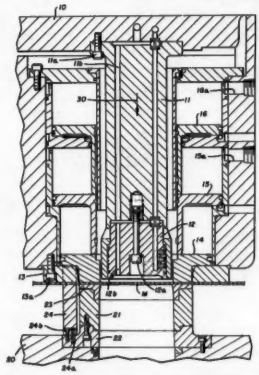
APPARATUS FOR CONTROLLING MOVEMENT IN A SINGLE ACTION FORMING PRESS

Joseph D. Bulso, Jr., Canton, and James A. McClung, North Canton, both of Ohio, assignors to Redicon Corporation, Canton, Ohio

Continuation of Ser. No. 12,625, Feb. 9, 1987, Pat. No. 4,796,454. This application May 23, 1988, Ser. No. 197,824

Int. Cl.[4] B21D *22/00*

U.S. Cl. 72—336 **3 Claims**



1. In a press for forming objects from a piece of material, said press having a movable slide and a fixed base, the improvement comprising:

(a) a draw horn secured to the slide for movement therewith toward and away from the base;

(b) a draw pad carried by the slide and movable toward the base and into engagement with the material under fluid pressure;

(c) a blank cut edge carried by the slide for movement therewith toward and away from the base;

(d) a blank and draw die carried by the base for cooperation with said cut edge and said draw horn; and

(e) a plurality of stop members carried by and projecting from the base and dimensioned so as to directly engage the draw pad without engaging the material and arrest its movement toward the base after a predetermined amount of travel thereof and after engagement with the material by said draw pad and movement of said blank cut edge toward the base.

4,873,860

LIFTING BEAM ASSEMBLY FOR A FORMING PRESS

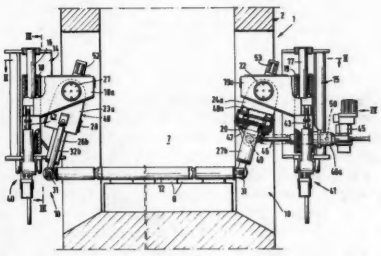
Eberhard Werner, Leverkusen, Fed. Rep. of Germany, assignor to Eumuco Aktiengesellschaft Für Maschinenbau, Leverkusen, Fed. Rep. of Germany

Filed Aug. 18, 1987, Ser. No. 86,531

Claims priority, application Fed. Rep. of Germany, Feb. 26, 1987, 3706160

Int. Cl.[4] B21J *13/08*

U.S. Cl. 72—405 **14 Claims**



1. A lifting beam assembly for transporting workpieces from work station to work station in a forming press, said assembly comprising:

(a) support means for mounting transport beam means to the forming press for grasping workpieces to be transported within the forming press,

(b) first drive means including slide member means slidably mounted on the support means for executing vertical movement to raise and lower the transport beam means,

(c) second drive means including swing arm means pivotally mounted to the slide member means for executing longitudinal movement of the transport beam means in a direction parallel to the direction traveled from work station to work station,

(d) third drive means mounted to swing with the swing arm means for pivotally executing transverse opening and closing movement of the transport beam means, and

(e) each said drive means including movement actuating means for effecting said respective vertical, longitudinal and transverse movements, and an actuating shaft secured at one end thereof for hydraulic actuation by electro-hydraulic booster means and coupled at the other end thereof to the movement actuating means.

4,873,861

LIFTING ARRANGEMENT IN VEHICLE CHASSIS STRAIGHTENING BENCHES

Hans R. Bergstrom, Kungsor, Sweden, assignor to Car-O-Liner Company, Wixom, Mich.

Filed Jun. 29, 1988, Ser. No. 212,874

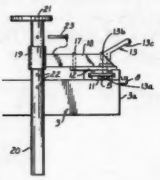
Claims priority, application Sweden, Jun. 30, 1987, 8702701

Int. Cl.[4] B21D *01/12*

U.S. Cl. 72—457 **14 Claims**

1. A lifting apparatus for a vehicle chassis straightening bench having a horizontal chassis support frame with an elon-

gate guide track carried by the frame and the frame being constructed and arranged to be raised and lowered above a base plane, which comprises: a guide attachment constructed to be removably receivable on and releasably securable to the guide track, a manually operable clamp carried by said guide attachment and constructed and arranged to releasably secure said guide attachment when on the track to the frame, an arm separate and removable from said guide attachment and constructed and arranged to be carried by, supported by and releasably secured to said guide attachment, a post guide secured to said arm and constructed and arranged to slidably receive a post, a post slidably received in said post guide and



with its axis extending substantially vertically when said arm is received on said guide attachment when received on the guide track and secured to the frame, the upper end of the post constructed and arranged to support a part of a vehicle chassis, said straightening bench and lifting apparatus in assembled relationship beinc constructed and arranged such that lowering of the support frame from a raised position will result in displacement of the upper end of the post relative to the frame and said post having a length such that when the frame is lowered through a predetermined distance said post supports the chassis part and upon further lowering of the frame said chassis part will be displaced by said post relative to the frame.

4,873,862

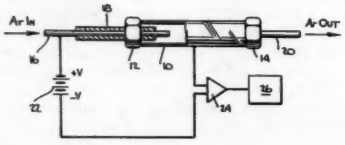
IONIZATION DETECTORS FOR GAS CHROMATOGRAPHY

Raymond P. W. Scott, Avon, and Elena Katz, Westport, both of Conn., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Continuation-in-part of Ser. No. 852,489, Apr. 16, 1986, abandoned, which is a continuation-in-part of Ser. No. 808,965, Dec. 16, 1985, abandoned. This application Jan. 9, 1987, Ser. No. 4,810

Int. Cl.[4] G01N *31/08*

U.S. Cl. 73—23.1 **14 Claims**



1. For use in gas chromatography, a detector of the type including a detection chamber, means for establishing an electrical potential across said chamber, and means for causing evolution of free electrons in said chamber, the improvement wherein the electron evolution causing means comprises:

a noble gas within said chamber;

a volume of glass having a surface in said chamber in contact with said noble gas, at least said surface of the glass having been subjected to preconditioning treatment for stabilizing its emissivity of electrons; and

means for heating said glass and noble gas to a temperature sufficient to induce evolution of electrons therefrom.

4,873,863

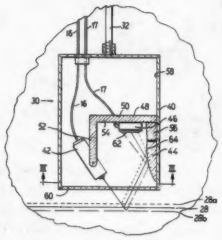
VOLUMETRIC LEAK DETECTION MEANS AND METHOD

J. D. Bruhl, 2074 Audubon Dr., Glendale Heights, Ill. 60137, and William R. Geisinger, 204 Parkchester Rd., Elk Grove, Ill. 60007

Filed Nov. 29, 1988, Ser. No. 277,314

Int. Cl.[4] G01M *3/38*; G01F *23/22*

U.S. Cl. 73—49.2 **16 Claims**



1. In a method of volumetric leak detection, the steps of:

(a) directing a collimated beam of energy onto a surface of a liquid;

(b) causing said beam to be reflected from said surface;

(c) receiving said beam reflected from said surface with a reflector;

(d) receiving said reflected beam from said reflector receptor;

(e) detecting a position of a footprint of said beam on said receptor;

(f) causing said footprint to change position in exaggerated proportion relative to changes in the level of said surface by means of a curved reflecting surface on said reflector;

(g) detecting any changes of the position of said footprint;

(h) correlating said changes in position of said footprint with changes in the level of said surface; and

(i) correlating changes in the level of said surface with volumetric changes in said liquid.

4,873,864

PRESSURE GAUGE WITH A MOVABLE INTERIOR SCALE

Tien-Tsai Huang, No. 4, Lane 30, Wu-Chuan St., Pan-Chiao, Taiwan

Filed Jul. 8, 1988, Ser. No. 216,373

Int. Cl.[4] B60C *23/02*; G01L *7/16*

U.S. Cl. 73—146.8 **2 Claims**

1. A pressure gauge comprising:

an elongated hollow body having a closed chamber therein, an intake passage communicating with said closed chamber and having an air inlet communicating exteriorly of said pressure gauge, a charge port provided between said closed chamber and said intake passage, and a discharge port communicating with said closed chamber and exteriorly of said pressure gauge;

a spring-biased charge valve disposed at said charge port, normally biased to close said charge port so as to stop air flow between said closed chamber and said intake passage when no pressurized air enters said intake passage, and driven to open said charge port by pressurized air entering said intake passage;

a sliding member mounted in said closed chamber in sealing engagement therewith, and slidable in said closed chamber when pressurized air enters said closed chamber, said

discharge port being positioned between said charge port and said sliding member;

a pressure indicating scale carried by and extending away from said sliding member;

a display hole formed in said body and aligned with said scale so that said scale is visible through said display hole;

a spring-biased discharge valve disposed at said discharge port normally biased to close said discharge port and manually openable to release pressurized air in said closed chamber; and

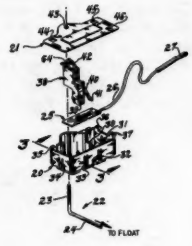
a spring connected at an upper end to said charge valve and at a lower end to said sliding member for biasing said sliding member to return to a normal position when said pressurized air is released from said closed chamber.

4,873,865

FUEL SENDER ASSEMBLY REQUIRING NO CALIBRATION

Robert D. Gaston, Dearborn Heights, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 27, 1988, Ser. No. 289,883
Int. Cl.[4] G01F *23/32, 23/36*
U.S. Cl. 73—317 **8 Claims**



1. A fuel sender assembly comprising:

a float rod having a pivot portion and an arm portion;

a housing member haing a rod hole rotatably securing said pivot portion and having an arcuate slot radially disposed from said rod hole;

a resistance element secured to said housing member and having a first connection thereto;

a carrier element extending through said arcuate slot, said carrier element having an interior portion receiving said pivot portion and having an exterior portion receiving said arm portion; and

spring contact means rigidly coupled to said interior portion of said carrier element for slidably contacting said resistance element as a second connection thereto;

whereby said carrier element abuts the ends of said arcuate slot to provide stop limits for the rotation of said float rod.

4,873,866

METHOD OF HYDROSTATIC WEIGHING AND KIT

Bert L. Fairbanks, 2306 22nd Avenue South, Lethbridge, Alberta, Canada (T1K 1J5)

Filed Apr. 3, 1987, Ser. No. 33,771
Int. Cl.[4] G01N *9/08*
U.S. Cl. 73—437 **8 Claims**

1. A method of determining density of a person's body which comprises:

A. filling with water and closing a rigid container capable of being grasped by the person whose body density is being determined and sinking the person and container in a body of water, adding, if necessary, a weight X to the container;

B. removing water from said container until it contains just enough air to suspend the person grasping it in the body of water above the bottom and below the surface;

C. determining the weight of water in grams required to refill the container, taking as the person's weight in grams in water (i) that weight where no weight X is added and (ii) that weight less weight X where added; and

D. calculating the density of the person's body from the formula D=Wa/(K) where Wa is the weight of the person in air in grams, K=WA−Ww divided by the density of the water where Ww is the weight of the person's body in grams in water as determined in step C.

4,873,867

REDUNDANT SIGNAL DEVICE FOR AUTO CRASH TESTING

Walter K. McPherson, Marysville, and James L. Blaker, West Liberty, both of Ohio, assignors to TRC, Inc., East Liberty, Ohio

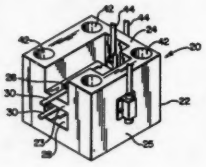
Filed Feb. 12, 1988, Ser. No. 155,606
Int. Cl.[4] G01P *15/08*
U.S. Cl. 73—493 **1 Claim**

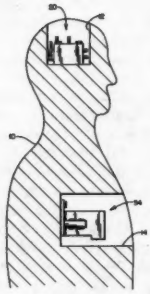
1. An apparatus for measuring simulated body forces relative to certain reference planes comprising an anthropomorphic dummy; a force site cavity within said dummy, and a mounting block provided with acceleration sensing means mounted within said force site cavity, said mounting block comprising, in combination;

(1) at least three wall segments forming a mounting block cavity; a respective one of said three wall segments positioned parallel to a respective one of three reference planes disposed perpendicular to and intersecting one another; a first one of said three wall segments forming a first pair of opposing parallel attachment surfaces closely spaced from one another wherein at least one of said first pair of attachment surfaces is disposed within the interior of said cavity; a second one of said three wall surfaces forming a second pair of opposing, parallel attachment surfaces closely spaced from one another wherein at least one of said second pair of attachment surfaces is disposed within the interior of said cavity, and a third one of said three wall segments forming a third pair of opposing parallel attachment surfaces closely spaced from one another wherein at least one of said third pair of attachment surfaces is disposed within the interior of said cavity;

(2) force sensing means including a first pair of acceleration

sensing means, a respective one of said first pair mounted to a respective one of said first pair of attachment surfaces with respective seismic mass centers disposed within a predetermined distance from a selected common reference point, a second pair of acceleration sensing means; a respective one of said second pair mounted to a respective one of said second pair of attachment surfaces with respective seismic mass centers disposed within a predetermined distance from said selected common reference point; and a third pair of acceleration sensing means, a





respective one of said third pair mounted to a respective one of said third pair of attachment surfaces with respective seismic mass centers disposed within a predetermined distance from said selected common reference point; and whereof the sensitive axis of each member forming a respective pair of acceleration sensing means is aligned parallel to the sensitive axis of the other member of the pair and perpendicular to one of said reference planes to intersect the sensitive axis of one member of two different pairs of acceleration sensing means at a selected point within said mounting block cavity.

4,873,868

FORCE MEASUREMENT SENSOR INTEGRATED ON SILICON, AND A METHOD OF MANUFACTURE

Andre Pierre, Lyon; Francois Batilliet, Rambouillet; Jean-Pierre Brosselard, Paris; Alfred Permuy, Marseille; Francois-Xavier Pirot, and Serge Spirkovitch, both of Paris, all of France, assignors to Metravib R.D.S., Ecully Cedex, France

PCT No. PCT/FR87/00206, § 371 Date Feb. 9, 1988, § 102(e) Date Feb. 9, 1988, PCT Pub. No. WO87/07729, PCT Pub. Date Dec. 17, 1987

PCT Filed Jun. 10, 1987, Ser. No. 162,329

Claims priority, application France, Jun. 10, 1986, 86 08525

Int. Cl.[4] G01P *15/08, 15/125*

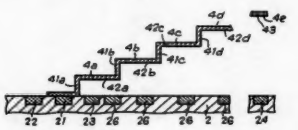
U.S. Cl. 73—517 R **7 Claims**

1. A force measurement sensor integrated on silicon, comprising:

a mono-crystalline silicon substrate having a first dopant and covered on at least a portion of its surface by a doped layer having a second dopant;

a variable capacitor comprising a first moving plate including a flexible conducting blade having a free end which is deformable by bending, said plate having an "anchor portion applied to a localized zone of said doped layer, and which is mounted so as to have a cantilevered portion including a set of staircase steps, each staircase step being shorter than a critical sticking length and co-operating with a doped zone having a high concentration of impurities situated beneath said step and capable of being individually biased, and a fixed second plate including a conducting zone made on said doped layer, said conducting zone facing said first plate and separated therefrom by an empty space which is a few microns across;

a first doped zone which is doped with a high concentration of said first dopant and which is situated in said doped



layer, the anchor portion being located on said first doped zone in order to constitute the gate of a junction field effect transistor (JFET);

second and third doped zones which are doped with a high concentration of said second dopant situated on either side of said first doped zone to constitute the drain and source zones of the JFET, the doped layer defining a zone having a low concentration of said second dopant situated beneath said first doped zone between said second and third doped zones in order to constitute the channel of said JFET whose gate is directly connected via the flexible blade to the moving plate of the variable capacitor; and

means for detecting a signal representative of variations in the position of said flexible blade.

4,873,869

DEVICE FOR THE SCANNING OF OBJECTS BY MEANS OF ULTRASOUND ECHOGRAPHY

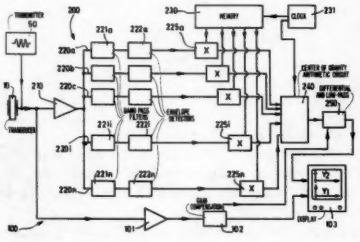
Mathias Fink, Meudon, France, assignor to U.S. Philips Corporation and Fujitsu Limited, Japan

Filed Aug. 26, 1982, Ser. No. 411,731

Claims priority, application France, Oct. 19, 1981, 81 19585

Int. Cl.[4] G01N *29/00*

U.S. Cl. 73—626 **18 Claims**



13. A method for measuring the attenuation of ultrasound in an object, comprising the steps of:

transmitting an ultrasound pulse into the object;

receiving a reflected ultrasound wave from the object;

analyzing the spectrum of a first parameter which represents the strength of the reflected wave; and

calculating a second parameter which is an indicator of the spread of the first parameter as a function of frequency

over the entire frequency range of the received wave and which is also directly locally correlated with the slope of the curve of the variation of the ultrasound attenuation in the object as a function of frequency.

4,873,870

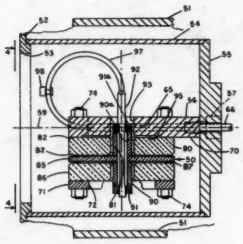
MICRO DISPLACEMENT FORCE TRANSDUCER

Leroy C. Delatorre, Sugarland, Tex., assignor to Panex Corporation, Sugarland, Tex.

Filed Jan. 19, 1988, Ser. No. 145,373

Int. Cl.[4] G01L *7/04, 9/12*

U.S. Cl. 73—733 **25 Claims**



1. A force sensitive capacitance device for developing capacitance values as a function of force applied to said device, said force sensitive capacitance device having a capacitor member with a micro-displacement range of movement for developing said capacitance values, said force sensitive device being disposed between a reference base support member and a force linkage member attached to said capacitor member,

a pressure responsive member attached to said force linkage member, said pressure responsive member having a relatively large displacement range of movement as compared to the displacement range of movement of said capacitor member, said pressure responsive member being responsive to pressure to displace said force linkage means,

said capacitor member being constructed from quartz and being cylindrically shaped about a central axis, said capacitance device further including cylindrically shaped base members constructed from quartz and disposed to either side of said capacitor member, a tubular boss member constructed from quartz and bonded to said capacitor member, said force linkage member being coupled to said boss member.

4,873,871

MECHANICAL FIELD EFFECT TRANSISTOR SENSOR

Monty W. Bai, Scottsdale, and Douglas J. Huhmann, Tempe, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 17, 1988, Ser. No. 207,993

Int. Cl.[4] G01B *7/16*

U.S. Cl. 73—777 **9 Claims**

1. A mechanical field effect transistor sensor comprising:

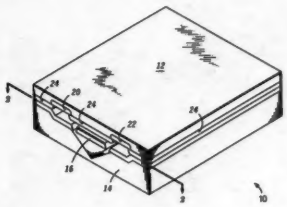
semiconductor portion means for conducting a current when a surface concentration of electrons of said semiconductor portion means is altered;

deflectable semiconductor means for sensing movement of the sensor;

a bottom portion of said deflectable semiconductor means secured above said semiconductor portion means;

said deflectable semiconductor means deflectable in a vertical direction with respect to said semiconductor portion means;

gate means for altering said surface electron concentration of said semiconductor portion;



said gate means micromachined onto a bottom side of a deflecting portion of said deflectable semiconductor means, and adjacent to said semiconductor portion.

4,873,872

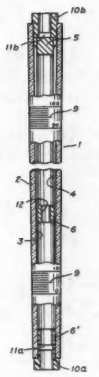
FLOAT FOR FLUID MEASUREMENTS

Lawrence I. Wechsler, 1 Wooleys Lane, Great Neck, N.Y. 11023

Filed Jan. 25, 1988, Ser. No. 148,011

Int. Cl.[4] G01F *1/22, 1/28;* G01N *11/12*

U.S. Cl. 73—861.57 **2 Claims**



1. A flowmeter comprising a vertically disposed tube which is open at both ends and has a tapered bore and a plurality of members disposed within the bore, at least one of the members having an aperture coaxial with the bore, arranged so that the successive members of the plurality respond to different ranges of fluid flow rate through the tube and, for any flow rate within a selected range, one of the members is maintained at a position between the ends of the tube.

4,873,873

AIR FLOW METERING TERMINAL AND CONTROL SYSTEM

James L. Day, Victor, N.Y., assignor to James L. Day Co., Inc., Victor, N.Y.

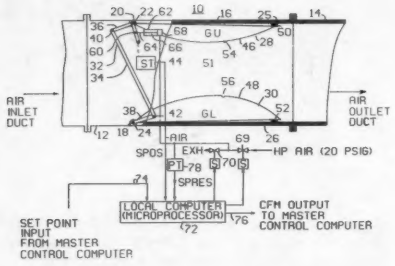
Filed Feb. 1, 1988, Ser. No. 150,968

Int. Cl.[4] G01F *1/44*

U.S. Cl. 73—861.63 **15 Claims**

1. An air flow metering system wherein air flow rate in a duct is both measured and controlled, said system comprising means movable in said duct for controlling the area therein for the passage of air therethrough in accordance with the position thereof, actuator means operative in response to an actuating signal for moving said controlling means and changing the

position thereof, position sensor means for providing a first output in response to the position of said controlling means, transducer means responsive to said actuating signal for providing a second output which is a function of the air pressure in said duct against said controlling means, and means responsive to said first and second outputs for determining the flow rate in said duct.

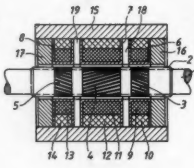


4,873,874

MAGNETOELASTIC TORQUE TRANSDUCER

Jarl Sobel, VästerÅs, Sweden, assignor to Asea Brown Boveri AB, VästerÅs, Sweden

Filed Sep. 19, 1988, Ser. No. 246,271
Claims priority, application Sweden, Sep. 28, 1987, 8703720
Int. Cl.[4] G01L *3/10*
U.S. Cl. 73—862.36 **6 Claims**



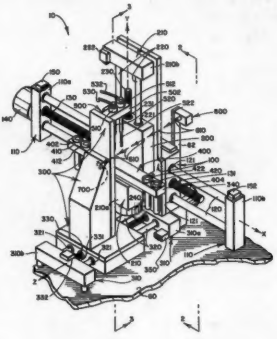
1. A magnetoelastic torque transducer comprising a shaft, stationary coils concentric with the shaft in order to excite the transducer with alternating current, and stationary coils concentric with the shaft to measure the external torsional moment applied on the shaft, and a magnetic casing also located concentrically with the shaft, where said shaft has three parallel annular zones provided with such anisotropy that the magnetic field in the shaft is deflected by an angle α approximately equal to 45° to a generatrix to the shaft in the outermost zones and is deflected by an angle α approximately equal to $-45°$ to a generatrix to the shaft in the intermediate zone, the axial extension of both outer zones being substantially half that of the intermediate zone and where the excitation is arranged using three separate coils, connected in series, each being located concentric with an annular zone and the outer excitation coils being wound with substantially half as many turns as the central excitation coil and that concentric with each excitation coil is a measuring coil, the outer measuring coils being wound with substantially half as many turns as the central measuring coil and this being arranged to be inverse-connected to the outer measuring coils.

4,873,875

SYSTEM FOR OPTICALLY INTERROGATING LIQUID SAMPLES AND FOR WITHDRAWING SELECTED SAMPLE PORTIONS

William H. Cork, Brecksville, Ohio, assignor to Prism Technology, Inc., Brecksville, Ohio

Filed Jun. 27, 1986, Ser. No. 879,588
Int. Cl.[4] G01N *1/14, 21/17*
U.S. Cl. 73—863.01 **5 Claims**



1. A method for interrogating a sample of liquid to locate at any vertical location within the sample a region of interest in the form of a layer of liquid of substantially an degree of thinness to as low as on the order of 10–50 microns that has top and bottom surfaces that extend substantially horizontally, and to withdraw and collect liquid from the region of interest, wherein the sample is of a type that has at least one light influencing characteristic that varies from position to position within the sample, including the steps of:

(a) projecting a beam of collimated, polarized light from a laser along a substantially horizontal path of travel;

(b) arranging the relative positions of said path of travel and of the sample of liquid so that the beam of light intercepts selected portions of the sample of liquid as the beam is projected along said path of travel;

(c) arranging the relative positions of said path of travel, the sample of liquid, and a light sensitive detector means to cause the detector means to receive light from the beam that has been transmitted substantially in a straight line path through said selected sample portions;

(d) effecting relative movement of the sample with respect to said path of travel and the detector means, to cause scanning by the beam of light of said selected sample portions, with light from the beam that has been transmitted through said selected sample portions that have been scanned by the beam of light (referred to hereinafter as "said scanned sample portions") being received by the detector means.

(e) Operating the detector means to sense received light from said scanned sample portions and to generate an electrical output signal that has a value which is representative of at least one sense characteristic of the received light, with variations in values of the output signal being representative of variations from position to position within said scanned sample portions of at least one transmitted light influencing characteristic of the sample, and to coordinate output signal values with indications of corresponding positions within the sample, to thereby locate within said scanned sample portions at least one region of interest;

(f) providing liquid withdrawal means for insertion into the sample, with the liquid withdrawal means having structure defining an inlet opening for withdrawing liquid from the sample through the inlet opening;

(g) effecting relative movement of the sample of liquid and the liquid withdrawal means to insert the liquid withdrawal means into the sample of liquid to position the inlet opening thereof substantially at any desired vertical location in the sample in communication with liquid within the layer that forms said region of interest;

(h) operating the liquid withdrawal means to effect withdrawal of liquid from within the layer that forms said region of interest through the inlet opening and to collect the withdrawn liquid; and,

(i) wherein the step of effecting positioning of the sample includes the steps of:

(i) providing the sample in an elongate, vertically extending test tube formed of substantially transparent material such as glass, with the test tube defining an interior of substantially circular cross section wherein the sample is carried; and,

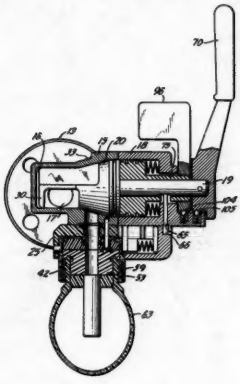
(ii) moving the test tube containing the sample in a substantially horizontal direction that extends transverse to said path of travel of the light beam to be transmitted through a layer of the sample while operating the detector means to locate the optimum relative positioning of the test tube and said path of travel of the light beam that maximizes the light transmission through the sample, whereby the test tube is caused to be horizontally centered with resect to the travel path of the beam.

4,873,876

CHEMICAL PROCESS SAMPLER

Michael Sheridan, Old Bridge, N.J., and Kenneth Jaffe, Boulder, Colo., assignors to Ethylene Corp., Murray Hill, N.J.

Filed Nov. 7, 1988, Ser. No. 267,984
Int. Cl.[4] G01N *1/20*
U.S. Cl. 73—863.86 **9 Claims**



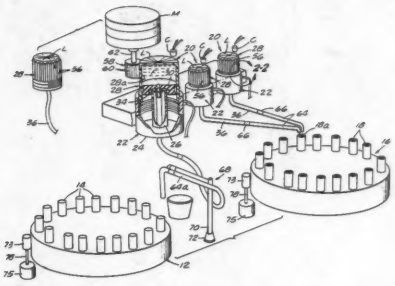
1. A chemical process sampler for use in extracting samples of material from a process line, comprising: a housing element adapted for in line positioning with respect to said process line, said housing element having laterally extending inlet and outlet passages for removal and return of samples to and from said process line; a valve element positioned within said housing having first, second and third positions of adjustment, a first position permitting continuous flow of material through said housing while maintaining said inlet and outlet passages in closed condition, a second position of which blocks flow of material directly through said housing, and directs said flow through said inlet and outlet passages; and a third position of which blocks said inlet passage while permitting flow through said outlet passage.

4,873,877

PRECISION LIQUID HANDLING APPARATUS

Arthur Harris, Palos Verdes Estates, Calif., assignor to Davis Meditech, Davis, Calif.

Filed Aug. 17, 1987, Ser. No. 85,659
The portion of the term of this patent subsequent to Apr. 19, 2005, has been disclaimed.
Int. Cl.[4] G01N *1/14*
U.S. Cl. 73—864.16 **9 Claims**



1. A liquid handling apparatus comprising:

(a) at least one first liquid reservoir;

(b) a liquid metering and aspirating device comprising:

(i) a threaded hollow base member having a bottom closure wall;

(ii) a rigid stator non-rotatably mounted within said base member;

(iii) a threaded liquid container adapted to be threadably interconnected with said base member upon rotation of said container relative to said base member, said container having an inner wall and a top closure wall;

(iv) liquid delivery means for conducting fluid from the interior of said liquid container to the exterior of the device; and

(v) a non-rotatable plunger reciprocally movable a precise axial distance within said liquid container only upon rotation of said container relative to said base member, said plunger having:

(1) sealing means adapted to sealably engage said inner wall of said liquid container for preventing leakage of fluid between said plunger and said inner wall upon non-rotatable axial movement of said plunger within said liquid container; and

(2) connecting means for operably interconnecting said plunger with said stator for preventing rotation of said plunger relative to said stator;

(c) first transfer means operably associated with said liquid delivery means of said liquid metering and aspirating device and said first liquid reservoir for transferring liquid between said liquid delivery means and said first liquid reservoir.

4,873,878

APPARATUS FOR INSPECTING AND HANGERING PANTS

David W. Milton, Middletown, Ohio, assignor to Cintas Corporation, Cincinnati, Ohio

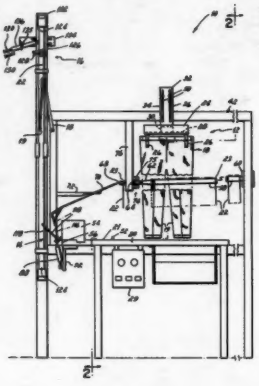
Filed Dec. 29, 1987, Ser. No. 139,293
Int. Cl.[4] G01N *33/36*
U.S. Cl. 73—865.8 **24 Claims**

1. Apparatus for inspecting and hangering pants comprising:

an inspection station including gripper means for gripping a pair of pants in position for inspection;

a hangering station including hanger support means for supporting a hanger, and pant support means for support-

ing the pair of pants in a position to engage a hanger on said hanger support means;



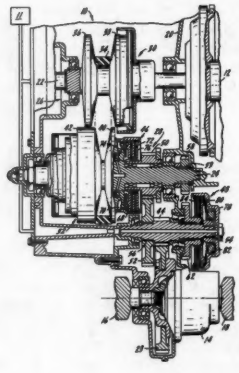
take-away means for removing the hanger from said hanger support means so that the pants are draped onto the hanger and lifted from said pant support means.

4,873,879

VARIABLE SPEED TRANSMISSION

Roger P. Butterfield, Interlaken; Guenter J. Neumann, Ithaca, and Curt A. Wykstra, Dryden, all of, assignors to Borg-Warner Automotive, Inc., Troy, Mich.

Filed Sep. 8, 1987, Ser. No. 93,671
Int. Cl.[4] F16H *37/02*
U.S. Cl. 74—689 **4 Claims**



1. In combination with a vehicle including an engine having a rotary output member, a continuously variable transmission operable in forward and reverse modes, said transmission comprising:

a driving shaft directly connected to said rotary output member;

a driven shaft;

stepless variable coupling means for interconnecting said shafts, said coupling means comprising driving and driven pulley assemblies which are interconnected with an endless belt, each pulley assembly including a pair of split sheaves, with one sheave being fixedly mounted and the other sheave being axially slidable on their respective shafts;

a differential having a ring gear for driving at least one rotary output power shaft extending from said differential; and

bidirectional gear drive mechanism means for transferring rotary motion between said driven shaft and said differential such that said rotary output member and said rotary output power shafts rotate in the same direction during the forward mode of operation, said mechanism means comprising:

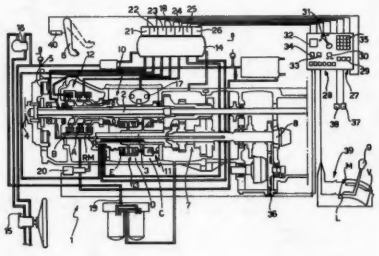
a two gear forward drive path including a forward gear rotatably mounted on said driven shaft and intermeshing with an intermediate gear spline connected to an intermediate shaft; a three gear reverse drive path including a reverse gear mounted on said driven shaft, an idler gear mounted on a stub shaft and a driven gear which is rotatably mounted on said intermediate shaft; a transfer gear connected onto said intermediate shaft between said intermediate gear and said driven gear for continuous meshing engagement with the differential ring gear and adapted to be driven by either gear mesh; a first fluid actuated starting clutch assembly for selectively connecting said driven shaft with said output power shafts through said differential and the two gear forward drive path; and, a second fluid actuated starting clutch assembly for selectively connecting said driven shaft with said output power shafts through said differential and the three gear reverse drive path, with the direction of output shaft rotation being controlled as a function of selective clutch engagement.

4,873,880

GEARBOX WITH ELECTRONICALLY-CONTROLLED HYDRAULIC CLUTCHES, FOR AGRICULTURAL TRACTORS AND SIMILAR VEHICLES

Giuseppe Amedei, and Giovanni Tornactore, both of Torino, Italy, assignors to Fiatgeotech-Tecnologie per la terra S.p.A., Modena, Italy

Filed Apr. 1, 1988, Ser. No. 176,549
Claims priority, application Italy, Apr. 1, 1988, 67258 A/87
Int. Cl.[4] F16H *5/48*
U.S. Cl. 74—336 R **13 Claims**



1. A gearbox with a large number of ratios, for agricultural tractors and similar vehicles, including a driving shaft and a driven shaft which are parallel to each other, first and second reduction stages carried by the driving shaft and the driven shaft and having permanently meshed gears defining a plurality of forward and reverse gear ratios, first and second hydraulic friction clutch units for engaging the gear ratios of the first and second reduction stages, hydraulic distributor means for engaging and disengaging the first and second clutch units in a combinable manner, a first manual control and respective piloting valve units for operating the distributor means to effect gear changes without interrupting the transmission of torque between the driving shaft and the driven shaft, a control pedal for operating the hydraulic friction clutches of the first unit as starting clutches, a flexible coupling operatively associated with the input of the driving shaft, a final mechanical,

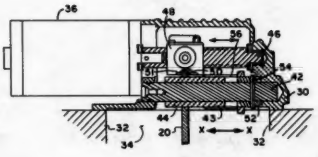
geared speed-range reduction stage operatively associated with the output of the driven shaft, and a second manual control for operating the final reduction stage, wherein the valve units include exclusively electro-hydraulic proportional-response valves, and wherein there are provided means for monitoring the operative conditions of the gearbox and of the tractor in which it is installed, which are adapted to generate electrical signals indicative of these conditions, and an electronic control unit which is supplied with these signals and is arranged to pilot the electro-hydraulic proportional-response valves so as to regulate the manner of combined engagement and disengagement of the hydraulic clutches in dependence of the operative conditions according to variable laws of pressure variation of said hydraulic clutches.

4,873,881

ELECTRICALLY ACTUATED X-Y SHIFTING MECHANISM

Stephen A. Edelen, Battle Creek; David T. Allen, Kalamazoo, and Bill E. Zylman, Portage, all of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Jan. 6, 1989, Ser. No. 294,030
Int. Cl.[4] F16H *5/44*; B60K *20/16*
U.S. Cl. 74—336 R **9 Claims**



1. An electrically actuated X—Y shifting mechanism for controlling the shifting of change gears of a mechanical change gear transmission of the type having at least one shift rail axially movable in a first axial (Y—Y) direction in a shift bar housing, said shift rail having a shift fork associated therewith and a block mechanism selectively engagable by an inner end of a mountable operated shift lever extending through an opening in the shift bar housing that is movable in a second (X—X) direction substantially transverse to the (Y—Y) direction for registration with the shift rail block mechanism and is movable in the (Y—Y) direction for engaging and causing said block mechanism to move the shift rail associated therewith axially to cause the shift fork associated therewith to effect the change gear shift, said mechanism comprising;

a shift mechanism housing mountable to said shift bar housing and having a shift finger extending into the shift rail housing opening therefrom,

a first shaft member mounted for rotation on the mechanism housing and having the central rotational axis thereof in substantial parallel alignment with the (X—X) direction,

a first carrier member disposed coaxially about the first shaft member and axially movable in opposite directions therealong and rotatable in opposite rotational directions about the rotational axis thereof, said carrier member having the shift finger fixedly secured thereto such that the axial movement of carrier member moves the shift finger in the (X—X) direction and rotational movement of the carrier member moves the shift finger in the (Y—Y) direction,

a second shaft member journaled for rotation in opposite rotational directions on the mechanism housing in spaced-apart relationship to the first shaft member, said shaft member externally threaded and having a central rotational axis thereof in substantial parallel alignment with the first shaft member central rotational axis,

a first threaded traversing member threadingly engaged with the second shaft member and operable to traverse in opposite axial directions therealong in response to rotation of the second shaft member in opposite rotational directions, said traversing member operably connected to the first carrier member by means enabling the traversing member to move the first carrier member axially along the first shaft member in and cause the shift finger to move in the (X—X) direction whilst enabling the first carrier member to rotate in opposite rotational directions about the first shaft member and cause the shift finger to move in the (Y—Y) direction,

at least one electrical motor mounted on the mechanism assembly and powered by an electrical power source, said motor drivingly connected to the second shaft member and operable to rotate the second shaft member in a rotational direction determined by an electrical shift rail selection instruction signal received thereby,

means enabling the motor to rotate the first shaft member in a rotational direction determined by an electrical gear change shift instruction signal received thereby,

means for rotating the first carrier member in response to rotation of the first shaft member, and

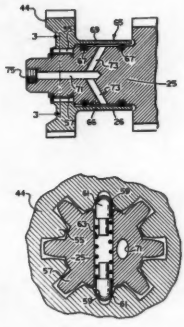
electrical circuit control means, operative to provide said shift rail selection instruction signal and said gear change shift instruction signal to in response to one of a selected operator input signal (S_1) or speed signal (S_2) received thereby.

4,873,882

MANUAL TRANSMISSION AND GEAR RATTLE DAMPER THEREFOR

Edward J. Goscenski, Jr., Battle Creek, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Sep. 28, 1988, Ser. No. 250,208
Int. Cl.[4] F16H *57/00*
U.S. Cl. 74—411 **9 Claims**



1. A manual transmission of the type including housing means, an input shaft rotatably supported relative to said housing means and adapted to receive input drive torque from a source of motive power, and defining an axis of rotation; an output shaft rotatably supported relative to said housing means and defining an axis of rotation generally parallel to said input shaft; a countershaft rotatably supported relative to said housing means and having an axis of rotation generally parallel to said axes of said input and output shafts; a head gear being fixed to rotate with said countershaft, and to transmit input drive torque thereto from said input shaft; a first drive gear having a set of peripheral gear teeth and being fixed to receive input drive torque from said countershaft; a first driven gear having a set of peripheral gear teeth in engagement with said gear teeth of said first drive gear; means shiftable between a first position in which said first driven gear is operable to transmit drive torque from said first drive gear to said output shaft, and a second position in which said first driven gear is operable to free-wheel relative to said output shaft; and means for dampen-

ing the transmission of torsional vibrations from said head gear to said countershaft, characterized by:

(a) said countershaft and said head gear cooperating to define lost motion means operable to limit the rotation of said head gear relative to said countershaft;

(b) means biasing said countershaft toward a centered position relative to said head gear, wherein said countershaft is disposed between its rotational limits, relative to said head gear; and

(c) said head gear and said countershaft cooperating to define a viscous damper portion, disposed separately from said lost motion means, said viscous damper portion being operable when filled with viscous fluid, to dampen relative rotation between said countershaft and said head gear.

4,873,883

MECHANICAL TRANSMISSION MANUAL CONTROL DEVICE

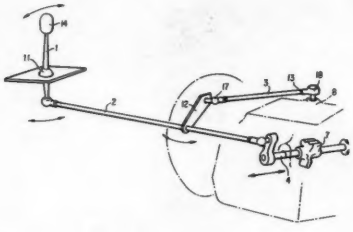
Venant André, Meyzieu, France, assignor to Renault Vehicules Industriels, Lyons, France

Filed Nov. 4, 1987, Ser. No. 116,686

Claims priority, application France, Nov. 7, 1986, 86 15547

Int. Cl.[4] F16H *57/06*

U.S. Cl. 74—473 R **11 Claims**



1. A mechanical transmission manual control device comprising:

(a) a manual gear control lever pivotally mounted on a shifting ball and having a manually operable portion at one end;

(b) a transmission control connector including a selector;

(c) a main control connecting rod connected between another end of said manual gear control lever and said transmission control connector, said main control connecting rod having a connecting rod lever fixed thereon;

(d) a reaction link pivotally connected to said connecting rod lever; and

(e) means for modifying one of said manual gear control lever, said transmission gear connector, said main control connecting rod, and said reaction link such that positions of said manually operable portion and said selector are changed relative to one another, said means comprising:

(i) an actuator connected to a stationary element and

(ii) a reversing lever having one end pivotally connected to said stationary element and another end pivotally connected to a movable rod of said actuator, said reaction link being pivotally connected to a mid-portion of said reversing lever.

4,873,884

APPARATUS FOR SUPPORTING SHIFT LEVER FOR TRANSMISSION

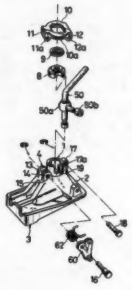
Ichiji Yamada, Toyota; Yutake Inuzuka, Nishio; Isao Ichihara; Michiyuki Murakami, both of Toyoake; George Suzuki, Chiryu; Ryou Yanahashi, Aichi, and Takeshi Kondo, Nagoya, all of Japan, assignors to Toyota Jidosha Kabushi Kaisha and Tsuda Industries, Co., Ltd., both of Aichi, Japan

Filed Aug. 17, 1988, Ser. No. 233,034

Claims priority, application Japan, Sep. 8, 1987, 62-137099[U]; Sep. 8, 1987, 62-137100[U]; Sep. 21, 1987, 62-144149[U]; Jun. 13, 1988, 63-145062

Int. Cl.[4] G05G *8/16*; F16C *11/06*; F16D *1/12*

U.S. Cl. 74—473 P **8 Claims**



1. A shift lever supporting apparatus kfor a transmission, comprising:

a cylindrical shift lever mounting portion for receiving a ball portion of a shift lever;

a pyramidal retainer portion contiguously provided below said shift lever mounting portion;

a plate portion contiguously provided below said retainer portion;

a bearing portion for mounting a select bell-crank, said bearing portion being contiguously provided on said retainer portion and in close proximity to said shift lever mounting portion, said four portions, that is, said mounting portion, said retainer portion, said plate portion and said bearing portion, being formed integral with each other;

a seat surface for supporting the ball portion of said shift lever, said seat surface being provided inside said shift lever mounting portion;

a U-shaped notch provided in the side wall of said shift lever mounting portion, said notch allowing insertion of a select lever extending from said ball portion; and

a cap detachably fitted on said shift lever mounting portion for pressing and retaining said ball portion on said seat surface.

4,873,885

DEVICE FOR THE DISCONNECTABLE COUPLING OF A TOGGLE JOINT TO A TELEMANIPULATOR SLAVE ARM

Eric Teillauchet, and Angelo Bandiera, both of Vendome, France, assignors to Societe Nouvelle D'Exploitation La Calhene, Velizy-Villacoublay, France

Filed May 10, 1988, Ser. No. 192,198

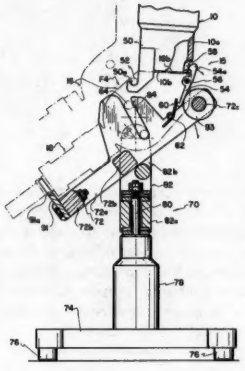
Claims priority, application France, May 20, 1987, 87 07068

Int. Cl.[4] B25J *3/00*; G05G *1/04*

U.S. Cl. 74—520 **6 Claims**

1. Device for the disconnectable coupling of a toggle joint (16) to a telemanipulator slave arm (10, 14), said arm having a shaft (10*a*) with a longitudinal axis and an open end in which are mounted driving gears (26*a*, 26*b*, 26*c*) whose axis is perpen-

dicular to said longitudinal axis (24), and the toggle joint (16) having a case (16*a*) supporting driven gears (30*a*, 30*b*, 30*c*) about a transverse axis (28) adjacent to an opening of the case and a gripper support rod (38, 40, 48) having an axis orthogonal to said transverse axis mounted in the case (16*a*) by a pivot pin (34) parallel to said transverse axis (28), the coupling device (15) connecting the case (16*a*) to the shaft (10*a*) in such a way that the opening of the case is adjacent to the open end of the shaft, the pairwise meshed driving and driven gears with their parallel oriented axes are located in a plane containing the longitudinal axis of the arm and the pivot pin of the gripper support rod located on one side of said plane, wherein said device (15) comprises:



at least one spindle (52) fixed to the toggle joint case (16*a*) in accordance with an axis parallel to the pivot pin (34) of the gripper support rod and located on the same side as said pivot pin with respect to said plane beyond said opening;

at least one rigid hook (50) fixed to the shaft (10*a*) and projecting beyond its open end so as to partially surround said spindle (52) under the effect of a relative pivoting between the toggle joint (16) and the end of the arm about the axis of the spindle; and

means (54, 58, 60) for locking the case (16*a*) to the end of the shaft (10*a*) located on the opposite side with respect to said plane.

4,873,886

ARMREST FOR BICYCLE HANDLEBAR

Rolf Renner, P. O. Box 1819, Healdsburg, Calif. 95448

Filed Jan. 26, 1988, Ser. No. 148,670

Int. Cl.[4] B62K *21/12*

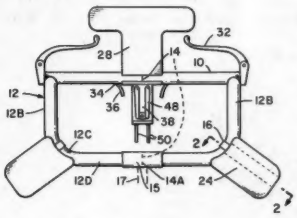
U.S. Cl. 74—551.8 **2 Claims**

1. A handlebar for mounting to a bicycle having a handlebar stem, said handlebar comprising:

a bent tubing portion forming a U-shape and terminating in two ends, said bent tubing portion including a pair of curved sections adjacent a central section, said central section conditioned for attachment to said bicycle handlebar stem;

a straight tubing portion connecting said bent tubing portion ends; and

a pair of armrest portions connected to said bent tubing portion curved sections wherein said armrest portions each comprise a generally rectangular armrest bearing a concave side for placement against said curved section, and a central hole, and further comprising a tubular handgrip for insertion into said central hole, said handgrip including clamping means for attachment to said bent



tubing portion curved sections, and further including a flange portion for capture of said armrest.

4,873,887

TORSION-VIBRATION DAMPER

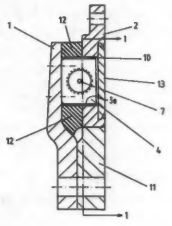
Rainer Andra, Limburg; Klaus Kurr, Weinheim-Hohensachsen; Gunter Ullrich, Hemsbach, and Udo Dorge, Laudenbach, all of Fed. Rep. of Germany, assignors to Firma Carl Freudenberg, Weinheim/Bergstrasse, Fed. Rep. of Germany

Filed Nov. 5, 1987, Ser. No. 117,792

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1986, 3639190

Int. Cl.[4] F16F *15/10*

U.S. Cl. 74—573 F **10 Claims**



1. A torsion-vibration damper for isolating small amplitude torsional vibrations and damping large amplitude torsional vibrations comprising:

first and second rings having walls rotatable relative to each other about an axis of rotation;

at least one liquid-filled chamber spaced from the axis of rotation, said chamber being circumferentially bounded by a wall of said first ring;

said second ring including a partition dividing said at least one liquid-filled chamber into subchambers;

at least one passage connecting said subchambers permitting flow therebetween for damping large amplitude torsional vibrations; and

a resilient wall part forming at least part of the boundary of said subchambers, said resilient wall part isolating small amplitude torsional vibrations.

4,873,888
VISCOSITY DAMPER

Jiro Matsuyama, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 30, 1988, Ser. No. 175,223
Claims priority, application Japan, May 26, 1987, 62-130214
Int. Cl.[4] F16F *15/16*
U.S. Cl. 74—574 3 Claims

1. A viscosity damper which comprises:
a damper casing attached to a motor shaft to be driven therewith;
a viscous fluid filled in said damper casing and
at least two inertia bodies each being surrounded by said viscous fluid so as not to be restricted from moving by said casing and so as to be movable independent of said casing and having different diameters and which are arranged in a co-axial relation with a space formed between said inertia bodies in the radial direction in said damper casing.

3. A viscosity damper which comprises:
a damper casing attached to a motor shaft to be driven therewith;
a viscous fluid filled in said damper casing; and
at least two inertia body arrangements each being surrounded by said viscous fluid so as not to be restricted from moving by said casing and so as to be movable independent of said casing and having different arc radius which are arranged in a co-axial relation with a space formed between said inertia body arrangments in the radial direction in said damper casing wherein each said inertia body arrangement is split in the circumferential direction into a plurality of pieces.

4,873,889
TIE BAR WITH INTERNAL LUBRICATION

Richard J. Ditlinger, South Bend, Ind., assignor to Allied-Signal Inc., Morristown, N.J.

Continuation of Ser. No. 645,210, Aug. 29, 1984, abandoned.
This application Dec. 3, 1985, Ser. No. 804,231
Int. Cl.[4] G05G *1/00*
U.S. Cl. 74—579 R 12 Claims

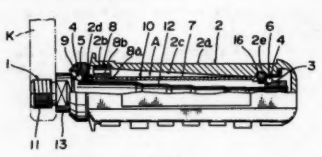
1. A connecting attachment of joining flexing structures subjected to high tensile stress, a tension-torsion tie-bar comprising:
a pair of spaced-apart bushings having spaced radially extending flanges,
a plurality of dry wrapped superimposed bands each including individual wires disposed in parallel arrangement and closely adjacent to one another and to the wires of adjacent superimposed bands, said wires each having a dry film lubricant thereon so that said wires may move freely relative to one another,
the bushings and plurality of superimposed bands comprising a solid link having semicircular ends with said bands extending as a pair of parallel, spaced-apart side portions, the bushings and spaced-apart side portions defining an area therebetween, the side portions and bands about the bushings having a substantially constant cross section of uniform thickness, and
a non-carcinogenic adhesive composition disposed continuously between the spaced-apart side portions and bushings and about the perimeters of said spaced-apart side portions to encapsulate the side portions, the adhesive composition extending to the perimeters and not between the adjacent

wires and superimposed bands so that the wires and bands form said constant cross section free of a composition matrix therebetween and the free movement of the wires relative to one another may occur without restraint from said composition, the composition filling completely said area between said side portions and bushings and maintaining the bushings in spaced-apart relationship, to provide a torsionally resilient tie-bar.

4,873,890
PEDAL FOR A BICYCLE

Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Sep. 12, 1988, Ser. No. 242,815
Claims priority, application Japan, Sep. 14, 1987, 62-140644[U]
Int. Cl.[4] G05G *1/14*
U.S. Cl. 74—594.4 4 Claims



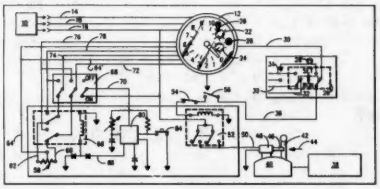
1. A pedal for a bicycle, said pedal comprising:
a shaft unit comprising a pedal shaft and a cylindrical rotary member rotatably supported to said pedal shaft;
a pedal body having at its outer surface a foot bearing surface and at its center portion a receiving bore in which said shaft unit is inserted;
support means for supporting said shaft unit inserted into said receiving bore of said pedal body at an axial outside portion of said pedal shaft to enable a portion of said pedal body disposed axially inward of said axial outside portion of said pedal shaft to be displaceable radially of said pedal shaft more than a portion of said pedal body located at said axial outside portion of said pedal shaft; and
an elastic member disposed at an axial inside portion of said pedal shaft within said receiving bore of said pedal body and comprising means for elastically supporting said pedal body relative to said shaft unit.

4,873,891

APPARATUS FOR IMPROVING EFFICIENCY AND CONSISTENCY OF A DRAG RACE CAR

Gary Guanciale, 500 Eagle La. #4, Camillus, N.Y. 13031

Filed Dec. 19, 1988, Ser. No. 286,090
Int. Cl.[4] B60K *20/02*
U.S. Cl. 74—625 **12 Claims**



1. In a drag racing car having an engine, an electrical power source, means for generating electrical signals commensurate with the rotational speed (RPM) of said engine, a tachometer providing a visual indication of said RPM, an automatic transmission having a neutral position and a plurality of forward gears, and a manually operable shifting lever movable to place said transmission in successively higher gears, the combination therewith of automatic shifting means for sequentially changing to a successively higher gear in response to said engine speed increasing to a selectively adjustable, predetermined RPM level from a lower RPM level, said automatic shifting means comprising:

(a) solenoid means including an armature movable in response to actuation of said solenoid;

(b) means coupling said armature to said shifting lever for movement of said shifting lever to change to a successively higher gear in response to movement of said armature;

(c) means limiting movement of said shifting lever to change by a single gear increment upon each actuation of said solenoid;

(d) relay means having contacts movable upon energization of said relay means to actuate said solenoid;

(e) means for actuating said relay means in response to said engine rpm reaching said predetermined level; and

(f) manually adjustable means for selectively adjusting the value of said predetermined RPM level.

4,873,892

POWER TRANSFER DEVICE

Masahiro Ohkubo, Osaka, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Neyagawa, Japan

Continuation of Ser. No. 724,575, Apr. 18, 1985, abandoned. This application Aug. 18, 1987, Ser. No. 88,494.
Claims priority, application Japan, Apr. 18, 1984, 59-77677; Apr. 18, 1984, 59-77678
Int. Cl.[4] F16H *1/44*
U.S. Cl. 74—710.5 **3 Claims**

1. A power transfer device for a vehicle comprising:

a power input part;

an intermediate gear mechanism including three members,

an intermediate input gear supported by said power input part in a driving relation;

an intermediate output gear meshing with said intermediate input gear and

a first gear (23) meshing with said intermediate input gear (20);

a first shaft being in meshing engagement and fixedly connected to said first gear of said intermediate gear mechanism;

a second shaft coaxially and rotatably journaled to said first shaft, forming a joint portion;

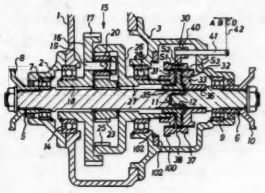
a stationary member mounted on a stationary portion of the vehicle;

a dog clutch mechanism housed at said joint portion of said first shaft and said second shaft and having a lock gear mechanism for selectively controlling the connection of said intermediate output gear with said first shaft, said second shaft and said stationary member; and

a control mechanism connected to said dog clutch mechanism,

wherein, said dog clutch mechanism comprises:

an input part which is mounted at a peripheral portion of said first shaft and is connected to said intermediate output gear



a second output part which is in meshing engagement and fixedly connected to said second shaft;

a first auxiliary output part which is in meshing engagement and fixedly connected to said first shaft and is housed between said input part and said second output part;

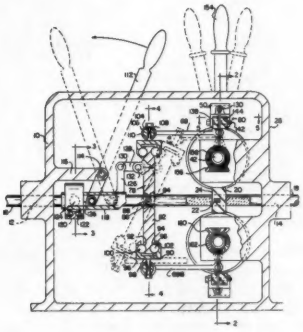
said dog clutch mechanism is selectively connectable to said stationary member, said input part, said second output part and said first auxiliary output part and includes said lock gear mechanism which can be actuated by said control mechanism for selectively connecting said lock gear mechanism with said stationary member, said input part, said second output part and said first auxilliary output part.

4,873,893

INFINITELY VARIABLE POSITIVE MECHANICAL TRANSMISSIONS

John H. Blakemore, 11213 S. Taylor St., Oak Park, Ill. 60304

Division of Ser. No. 609,235, May 11, 1984, Pat. No. 4,763,544. This application May 2, 1988, Ser. No. 189,035
Int. Cl.[4] F16H *37/06, 3/74*
U.S. Cl. 74—752 B **7 Claims**



1. A transmission comprising, in combination: an input shaft, an output shaft, means including a housing for mounting the input and output shafts on a common axis with each of said

shafts rotatable with respect to each other and with respect to the housing, a wobble plate with an opening at its center disposed about the input shaft, means operatively associated with the input shaft to wobble the wobble plate about a fixed position on the input shaft in unison with rotation of the input shaft, a first helical gear having a central axis, said first helical gear being mounted on the output shaft with its central axis coaxial with the output shaft for rotation with the ouput shaft, a third shaft mounted on the housing, said third shaft having a central axis disposed normal to the central axis of the first helical gear, a second helical gear journaled on said third shaft and meshed with the first helical gear, the second helical gear being rotatable with respect to both the housing and the third shaft, a second plate pivotally mounted on the third shaft and extending outwardly from the first helical gear, a connecting rod disposed in a plane traversing the input and output shafts, said plane being perpendicular to the axis of the third shaft, the connecting rod being pivotally mounted at one end on the second plate, the other end of said rod being coupled to the periphery of the wobble plate, and a one-way clutch mounted between the second plate and the second helical gear, said one-way clutch comprising a second rod mounted on the second plate outwardly of the second helical gear, the axis of the second rod being parallel to the axis of the third shaft, a casing mounted on the second rod and secured thereto, a pin mounted on the casing normal to the second rod and spaced from the second rod, said pin being disposed in the plane normal to the third shaft and centrally traversing the second helical gear, a third helical gear journaled on the pin and engaging the periphery of the second helical gear, and a pivot mechanism coupled to the casing to pivot the casing on the second rod.

4,873,894

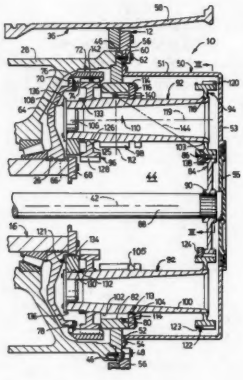
BALANCED FREE-PLANET DRIVE MECHANISM

Bennett W. Avery, Princeville, and William K. Engel, Peoria, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Oct. 31, 1988, Ser. No. 264,583

Int. Cl.[4] F16H *1/36, 1/28*

U.S. Cl. 74—785 **29 Claims**



1. A balanced free-planet drive mechanism comprising:
a hollow support assembly;
a ground-engaging wheel rotatably mounted on the support assembly along a central axis;
a reaction ring gear connected to the support assembly;
an output ring gear connected to the wheel;
an input sun gear arranged along the axis;
a plurality of floating planet elements individually including an axially outer gear intermeshed with the sun gear, an axially inner gear intermeshed with the reaction ring gear, and an axially intermediate gear intermeshed with the output ring gear; and
rolling ring means for limiting radial inward movement of the planet elements, the rolling ring means being substantially concentrically disposed on the central axis.

4,873,895

MANUFACTURE OF ROTARY DRILL BITS

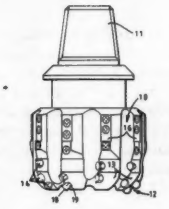
Malcolm R. Taylor, Gloucester; John D. Barr, Cheltenham, and John R. Smart, Gloucester, all of England, assignors to Reed Tool Company Limited, Gloucestershire, England

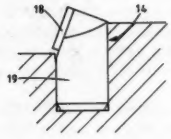
Filed Oct. 31, 1988, Ser. No. 265,237

Claims priority, application United Kingdom, Nov. 3, 1987, 8725670

Int. Cl.[4] B21K *5/02;* E21B *10/46*

U.S. Cl. 76—108 A **15 Claims**





1. A method of manufacturing a rotary drill bit of the kind comprising a bit body having a shank for connection to a drill string, a bit face on the bit body, a plurality of cutting structures mounted in sockets in the bit body and projecting from the face of the bit, and a number of openings in the face of the bit communicating with a passage in the bit body for supplying drilling fluid to the face of the bit, the method including the steps of dimensioning each cutting structure and the socket within which it is to be received to provide a clearance between the cutting structure and the socket, inserting the cutting structure in the socket, filling said clearance with a settable liquid, and then solidifying said liquid, the settable liquid solidifying at a temperature less than 400° C. and retaining its integrity, after solidification, at least up to a temperature of 180° C.

4,873,896

LIFT-TAB CONTAINER OPENER

Alan Hull, 100 Melrose East, Apt. 505, Seattle, Wash. 98102

Filed Dec. 12, 1988, Ser. No. 283,074

Int. Cl.[4] B67B *7/40*

U.S. Cl. 81—3.27 **3 Claims**

1. An opener for lift tab containers, said containers having a first longitudinal axis, a top and a tab attached to said top, said opener being attachable to a support surface and comprising:
a base attached to said support surface and having a flange extending generally horizontally from said support surface,
lift tab engaging means,
hinge means for attaching said tab engaging means to said

flange, said tab engaging means being attached to said flange by said hinge means, said hinge means limiting upward motion of said tab engaging means to a generally horizontal position and allowing free downward motion,

spring means incorporated in said hinge means to urge said tab engaging means to said generally horizontal position,

said lift tab engaging means comprising:

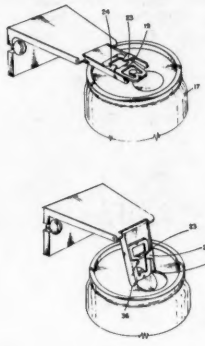
a base portion having a second longitudinal axis, an upper surface,

a lower surface, first and second edges and a first end,

first and second flanges extending from said first and second edges perpendicular to said upper surface,

said first flange having a first top edge and said second flange having a second top edge,

first and second tabs extending from said first and second top



edges parallel to said top surface toward each other part way across said lift tab engaging means,

said end being straight and perpendicular to said second longitudinal axis,

said lift tab engaging means further comprising first and second protuberances, said first protuberance located near said first end and said first edge and said second protuberance located near said first end and said second edge,

whereby when said lift tab is inserted into and engaged by said tab engaging means and said container is moved with said longitudinal axis maintained essentially vertical and such that said tab engaging means moves downward, said tab engaging means lifts said tab relative to said top and opens said container and further whereby when said motion is reversed said lift tab is returned essentially to its original position relative to said top.

4,873,897

DEVICE FOR UNLOCKING CAR DOORS

Sam Williams, 1843 Winchester, Memphis, Tenn. 38116

Filed Nov. 14, 1988, Ser. No. 270,238

Int. Cl.[4] E05B *19/20*

U.S. Cl. 81—15.9 **1 Claim**

1. A convenient device for unlocking car doors having vertical sliding locks with certain anti-theft mechanisms comprising:

(a) an elongated first section following a handle section;

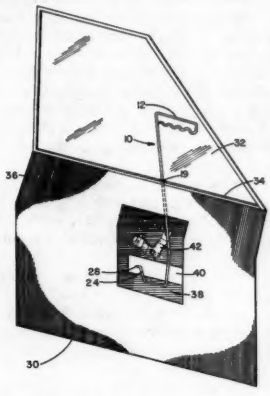
(b) a second section following said elongated first section forming an obtuse angle of substantially 165 degrees with a radius of approximately 0.250 inches, said second section defining a base axis;

(c) a third section following said second section forming approximately a 90 degree angle with a radius of substantially 0.125 inches;

(d) a fourth section following said third section forming substantially a 115 degree angle with a radius of approximately 0.250 inches away from said axis formed by said second section at substantially a 65 degree angle;

(e) a fifth section following said fourth section forming a 115 degree angle with a radius of approximately 0.250 inches, said fifth section being substantially perpendicularly in relation to said axis formed by said second section;

(f) a tip tapered at approximately 15 degree angle following said fifth section;



(g) a ring placed on said elongated first section 6.25 inches above beginning of said second section;

(h) said elongated first section is at least 6.25 inches long;

(i) said second section is substantially 3.750 inches long;

(j) said third section is approximately 2.625 inches long;

(k) said fourth section is substantially 2.125 inches long; and

(l) said fifth section and said tip are approximately 0.375 inches long.

4,873,898

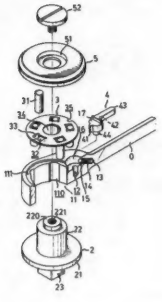
RATCHETLESS REVERSIBLE WRENCH

Shyh Chern, No. 111, Lane 41, Sec. 1, Hsingjen Rd., Tali Hsiang, Taichung Hsien, Taiwan

Filed Jan. 23, 1989, Ser. No. 299,777

Int. Cl.[4] B25B *13/46*

U.S. Cl. 81—59.1 **1 Claim**



1. A ratchetless reversible wrench with a handle portion (0) and a head portion (1) at one end thereof, said head portion (1) comprising the combination of:

(a) a substantially circular post compartment (11); said post compartment (11) having a plurality of concave receptacles (110) evenly spaced therearound; said post compart-

ment (11) having an annular recess (111) at an upper end thereof;

(b) a driving head piece (2) including an annular slip plate (21), a driving head block (23), and a cylindrical block (22); an upper surface of said slip plate (21) slidably contacting a lower surface of said post compartment (11); said cylindrical block (22) having a circular protrusion (220) at an upper end thereof;

(c) a circular post plate (3) including a plurality of gaps (32) evenly spaced therearound; each gap (32) having a slanted retainer plate (33) respectively set at each end thereof to retain a respective engagement post (31) in each gap (32) therein; a center hole (34) being set on said post plate (3) for tightly engaging with said circular protrusion (220);

(d) a circular tab (5) for covering said post plate (3); said tab (5) having a counterbore (51) thereon with a hole in the center thereof for receiving a screw (52); said screw (52) being threadably securable with threads (221) of said cylindrical block (22);

(e) a first bore (16) which is positioned proximate to a rear end of said post compartment (11); said first bore (16) having a central second bore (12) and a third bore (13) which extends angularly towards said handle portion (0); and

(f) a lever switch (4); said lever switch (4) having an arm (43), a circular portion (17), and a pivot post (44) thereon; said lever switch (4) being rotatable in said second bore (12) and having a vertically extending protuberance (41) on a front end thereof which is engageable with a notch (35) on said post plate (3);

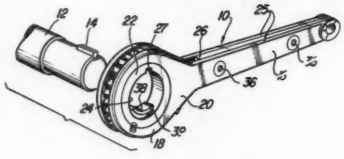
said arm (43) being rotatable about said pivot post (44) so that said protuberance (41) engages with a notch (35) on said post plate (3) to urge said post plate (3) and engagement posts (31) to rotate and wedge between a wall of said post compartment (11) and said cylindrical block (22) so as to frictionally urge said cylindrical block (22) and a driving head block (23) to rotate.

4,873,899

ADJUSTABLE RATCHET WRENCH FOR KEYED SHAFTS

Tadeusz L. Mazurek, 2241 Bernard, Hamtramck, Mich. 48212

Filed Dec. 18, 1987, Ser. No. 134,882
Int. Cl.[4] B25B *13/46, 13/16, 13/58*
U.S. Cl. 81—63 **13 Claims**



1. A ratchet wrench (10) for turning a shaft (12) having a key (14), comprising:

an elongated handle (16);

a head (18) connected to one end (20) of the handle;

a socket element (22) disposed within said head and having a substantially cylindrical inner diameter (24) extending along an axis (X) perpendicular to the handle, said socket element having a key receiving slot (27) extending outwardly from the inner diameter and in the same direction as said axis, said socket element further having an arcuate slot (42) therein;

ratchet means (28) operatively associated with said head and said socket element for selectively locking the socket element against rotation about the axis in one direction while permitting rotation in an opposite direction;

a crescent block (38) having an arcuate face (40) and an outer surface (41) shaped to be received by the arcuate slot (42) of the socket element, said arcuate face being eccentric relative to the outer surface and intersecting the outer surface (41) at two spaced ends of the crescent block, said crescent block being received within the inner diameter of the socket element diametrically opposite the key receiving slot with the ends being substantially equidistant from the key receiving slot, said crescent block being adjustable within the inner diameter of the socket element to receive and retain a shaft within the inner diameter of the socket element; and

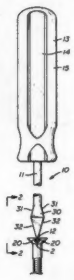
an adjustment screw (45) connected to the socket element and said crescent block to adjust said crescent block within the socket element.

4,873,900

SCREW DRIVING DEVICE

Massimo Ciumaga, 1639 Bissonnett, Houston, Tex. 77005

Filed Dec. 8, 1986, Ser. No. 944,470
Int. Cl.[4] B25B *15/02*
U.S. Cl. 81—436 **2 Claims**



1. A screw driving device comprising:

a shank;

a bit of rectangular cross-section formed at an end of the shank, two opposing surfaces of said bit being parallel to one another, parallel to the longitudinal axis of the shank and, when inserted into a screw slot, parallel to the longitudinal axis of the screw slot;

a flat surface on an end of said bit, wherein said flat surface is perpendicular to the longitudinal axis of said shank;

a means for applying torque to said shank; and

a blade of rectangular cross-section formed onto the end of said shank, upon which said bit is formed, wherein said blade tapers outwardly on all sides from said shank to a dimention greater than the diameter of said shank and wherein said blade thence tapers inwardly on all sides to the point where said bit is formed, the bit having a cross-sectional area not greater than the cross-sectional area of the blade at the point at which the blade meets the bit.

4,873,901

APPARATUS FOR CUTTING AND STRIPPING INSULATION FROM WIRE SEGMENTS HAVING DIFFERENT GAUGE CONDUCTORS

Herbert M. Stoehr, New Berlin, Wis., assignor to Artos Engineering Company, New Berlin, Wis.

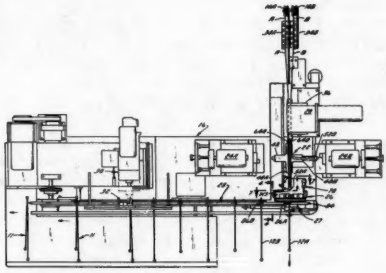
Filed Sep. 16, 1988, Ser. No. 245,359
Int. Cl.[4] H02G *1/12*
U.S. Cl. 81—9.51 **13 Claims**

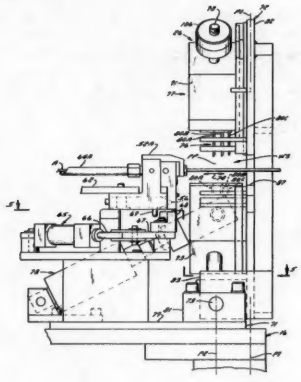
1. An apparatus for cutting a portion of insulation adjacent the ends of wire segments having different gauge conductors for the purpose of stripping said cut portion from said conductor comprising:

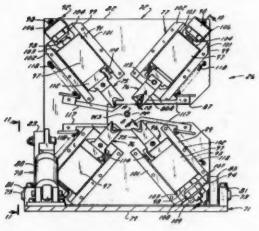
a main frame;

a workstation on said frame presenting a processing point at which said wire segment will be momentarily positioned for cutting said insulation as said segment follows a path of travel during processing;

a plurality of sets of cutting knives, each of said sets of knives having a cutting edge profile sized to cut the insulation on a specific gauge of conductor; and







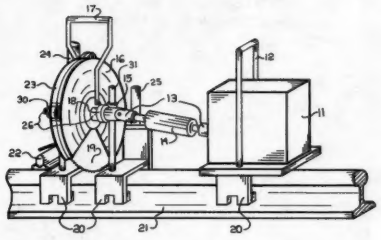
means for reciprocally mounting each of said sets of cutting knives on said main frame to extend radially away from opposite sides of said processing point to circumferentially space all of said sets around said processing point and for causing reciprocal movement of said knives in each set toward said processing point to a closed cutting position and away from said processing point to an open position to enable selective energization of a set of knives properly sized to fit the gauge of the wire segment conductor then at said process point.

4,873,902

RAILROAD RAIL COLD SAW

Adrian H. Krieg, 119 Maplevale Dr., Woodbridge, Conn. 06525

Continuation of Ser. No. 851,128, Apr. 11, 1986, abandoned.
This application Apr. 7, 1988, Ser. No. 180,671
Int. Cl.[4] B27B *5/18*; B23Q *3/08*; B23D *47/08*
U.S. Cl. 83—745 **8 Claims**



1. A railroad rail cold sawing device for securement about a railroad rail having a central web and flanges connected to opposite ends of the web, said device comprising:

a circular sawing section having a cold circular saw blade positioned above said rail;

a motor drive section;

first clamping means for removably clamping said sawing section to said central web of said railroad rail, regardless of any curvature in the central web;

second clamping means for removably clamping said drive section to said central web adjacent to said circular sawing section, regardless of any curvature in the central web; and

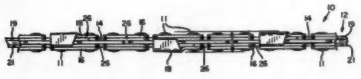
connection means removably connecting said drive section and said sawing section for causing rotation of said cold circular saw blade, said connection means including at least one joint means for permitting relative movement of said circular sawing section with respect to said drive section in at least a plane parallel to said web.

4,873,903

SAW CHAIN WITH WEAR LINK

Michael D. Harfst, Milwaukie, Oreg., assignor to Blount, Inc., Montgomery, Ala.

Filed Jul. 7, 1988, Ser. No. 216,191
Int. Cl.[4] B27B *33/14*
U.S. Cl. 83—830 **11 Claims**



1. In a saw chain having drive links and side links formed of steel pivotally interconnected by pin means extending through circular openings in said links, the drive links being constructed to ride in a center groove of a saw bar and the undersides of the side links being constructed to ride along the outer surfaces of a pair of parallel rails defining the groove, each side link receiving a pair of said pin means, the improvement comprising a plurality of wear links mounted one adjacent each of said side links and slidingly engaging said rails, each of said wear links having a pair of openings receiving said pair of pin means connecting the adjacent side link in the chain, said wear links being formed of a material having greater resistance to abrasion than said steel.

4,873,904

ELECTRONIC MUSICAL INSTRUMENT HAVING PLAYING AND PARAMETER ADJUSTMENT MODES

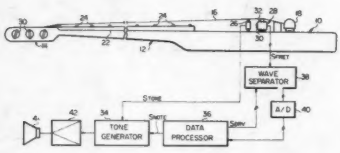
Takashi Norimatsu, Shizuoka, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Filed Apr. 21, 1988, Ser. No. 184,602

Claims priority, application Japan, Apr. 22, 1987, 62-100772; Apr. 22, 1987, 62-100773; Apr. 22, 1987, 62-100774

Int. Cl.[4] G10H *1/18, 3/18*

U.S. Cl. 84—722 **4 Claims**



3. An electronic musical instrument having a parameter adjustment mode and a playing mode of operation, comprising

(a) a plurality of fret members located at predetermined spacings;

(b) a string stretched over said fret members so that a player's depression of the string causes contact between the string and at least one of said fret members,

(c) vibration generating means for producing supersonic vibrations in said string;

(d) a fret-position detecting means responsive to the supersonic vibrations transmitted from said means for detecting the fret member contacted by said string;

(e) string displacement detecting means for detecting an amount of lateral displacement of said string on any of said fret members and producing data representative of the detected amount of lateral displacement of said string;

(f) memory means for storing said data representative of the amount of lateral displacemment detected with said string maintained in an non-bent state; and

(g) means for comparing the amount of lateral displacement of said string from the data produced by said string displacement detecting means during said playing operation with the data stored in said stored means for thereby producing bent-string data representative of a corrected amount of lateral displacement of said string.

4,873,905

AUTOMATIC PLAYER PIANO

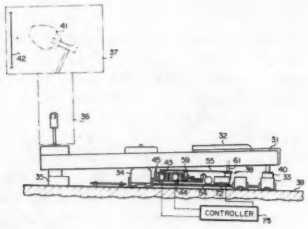
Kazuo Murakami; Yasutoshi Kaneko, and Takasi Tamaki, all of Shizuoka, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed May 17, 1988, Ser. No. 194,872

Claims priority, application Japan, May 18, 1987, 62-74670[U]; Aug. 26, 1987, 62-129333[U]

Int. Cl.[4] G10F *1/02;* G10C *3/20*

U.S. Cl. 84—20 **6 Claims**



1. An automatic player piano comprising

(a) a keyboard provided with a plurality of keys each having a front end portion, an intermediate portion and a rear end portion, said front end portion being pressed by a player for requesting a sound;

(b) key supporting means each provided on a key bed and having a front rail capable of engagement with said front end portion, a back rail capable of engagement with said rear end portion and a balance rail provided between the front rail and the back rail and rockably supporting said intermediate portion;

(c) a sound producing mechanism associated with said keys and operative to produce a sound;

(d) a plurality of key action mechanisms each engageable with the rear end portion of each key and operative to transfer a motion of the key to said sound producing mechanism; and

(e) a plurality of key actuator units each provided between said front and balance rails of said key supporting means and operative to pull down each of said keys for requesting a sound upon activation thereof, in which each of said key actuator units comprises a solenojd-operated key actuator movable up and down and means for connecting said key actuator to a lower side of each of said keys so that the key is pulled down when the key actuator is energized, wherein each of said key actuator units comprises an elongated plate member rockably supported by a bracket, a hook member fixed to each key and capable of being brought into engagement with one end of the elongated plate member, and the solenoid-operated key actuator operative to drive the other end of the elongated plate member for pulling down the hook member.

4,873,906

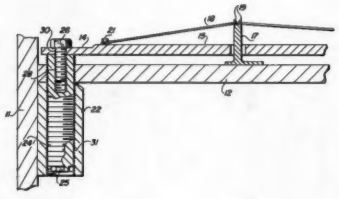
ADJUSTABLE STRINGPLATE MOUNTING MEANS FOR A GRAND PIANO

Lewis F. Herwig, 4417 E. Hearn Rd., Phoenix, Ariz. 85032

Filed Feb. 21, 1989, Ser. No. 313,046

Int. Cl.[4] G10C *3/04*

U.S. Cl. 84—184 **6 Claims**



1. In a musical instrument having a sound board affixed to a frame with an apertured stringplate mounted thereover, the improvement which comprises:

(a) elongate threaded means for movably engaging the frame and having first and second ends, the first end of said elongate threaded means extending through the soundboard for placement of the stringplate thereon;

(b) receiving means contained in the first end of said elongate means and aligned with an aperture in the stringplate, and

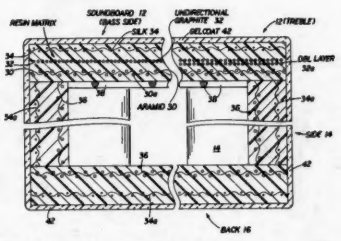
(c) fastening means extending through the aperture in said stringplate into said receiving means for urging said stringplate thereagainst, the rotation of said elongate means providing adjustment of the spacing between the stringplate and the soundingboard.

4,873,907

COMPOSITE-MATERIALS ACOUSTIC STRINGED MUSICAL INSTRUMENT

John A. Decker, Jr.; Linda M. Decker, both of Wailuku, and Christopher J. Halford, Makawao, all of Hi., assignors to Kuau Technology, Ltd., Wailuku, Hi.

Filed Jul. 31, 1987, Ser. No. 80,312
Int. Cl.[4] G10D *3/02*
U.S. Cl. 84—291 **12 Claims**



1. A soundboard for an acoustic stringed instrument, comprising

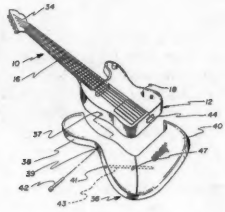
a composite-materials plate having a predetermined area density matching that of corresponding wooden soundboards for the same type of stringed instrument while having a predetermined bulk density (unmatched to and substantially exceeding the bulk density of such wooden soundboards.

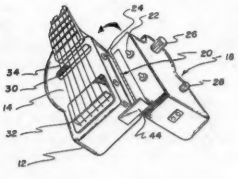
4,873,908

COLLAPSIBLE ELECTRIC GUITAR

James G. Moore, 904 Nickolaus Pl., Woodstock, Ga. 30188

Filed Aug. 3, 1988, Ser. No. 227,143
Int. Cl.[4] G10D *3/00*
U.S. Cl. 84—291 **16 Claims**





1. A collapsible guitar, comprising:

a main body having a neck portion;

a central body;

means for rotatably attaching said central body to said main body so that said central body and said main body are foldable together;

an outer body having an upper body and a rear body; means for connecting said upper body to said rear body so that said upper body can be rotated into generally longitudinal alignment with said rear body; and

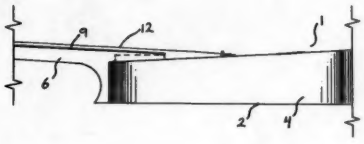
means for detachably connecting said outer body to said main body.

4,873,909

STRINGED MUSICAL INSTRUMENT

Thomas Humphrey, 124 W. 72 St., New York, N.Y. 10023

Continuation of Ser. No. 913,690, Sep. 30, 1986, abandoned. This application Dec. 8, 1987, Ser. No. 220,485
Int. Cl.[4] G10D *1/08*
U.S. Cl. 84—293 **11 Claims**



1. A guitar comprising: a body including a soundboard and a bottom interconnected by a sidewall; an elongated neck having an upper surface, a first end portion that extends on the soundboard and is fixed thereto, and a second free end; a fingerboard fixed to the upper surface of said neck, such that a portion of the fingerboard extends over the soundboard; wherein the upper surface of the neck and the fingerboard, in the portion extending over the soundboard, are elevated a distance above the soundboard, and wherein the neck and soundboard are arranged at an obtuse angle relative to one another so that the elevation of the neck upper surface and fingerboard relative to said soundboard increases in the direction of the free end of the neck; means on the free end of the neck for holding one end of each of a plurality of strings; and means for securing the other end of the strings to the body so that said strings extend along said fingerboard; said means including a bridge having a saddle over which the strings are directed to apply a downward force thereon.

4,873,910

DRUM FOOT PEDAL APPARATUS

Makoto Kurosaki, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Filed Mar. 7, 1989, Ser. No. 319,684
Claims priority, application Japan, Mar. 8, 1988, 63-29877
Int. Cl.[4] G10D *13/02*
U.S. Cl. 84—422.1 **5 Claims**

1. A drum foot pedal apparatus comprising:

a beater for striking a drum;

a frame for pivotally supporting a pivot shaft of said beater at both ends thereof;

a foot pedal, a front end of which is connected to said pivot shaft of said beater through a belt and a rear end of which is pivotally connected to a heel; and

a flat stabilizing plate disposed under said heel, said foot pedal, and said frame,

said frame being provided with screw holes at both side surfaces of a lower end portion of said frame,

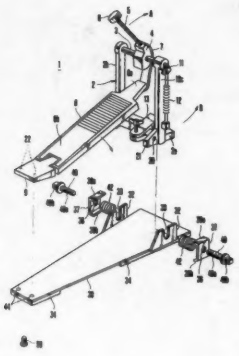
said stabilizing plate being provided with screw mounting portions having upward open U-shaped grooves respectively corresponding to said screw holes of said frame, said screw mounting portions being located on a frame side;

springs

fixing metal pieces;

fastening bolts; and

means for preventing said frame from being separated from said stabilizing plate,



said fastening bolts being threadably engaged with said screw holes of said frame through said U-shaped grooves of said screw mounting portions, said springs, and said fixing metal pieces, respectively.

4,873,911

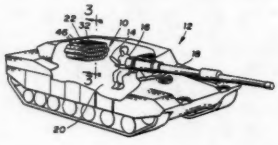
DOUBLE LOOP AMMUNITION MAGAZINE OF COMPACT CONSTRUCTION

Anthony J. Suchocki, Rochester Hills, Mich., assignor to General Dynamics Land Systems, Inc., Warren, Mich.

Filed Nov. 21, 1988, Ser. No. 273,940

Int. Cl.[4] F41D *10/22*

U.S. Cl. 89—34 **20 Claims**



1. An ammunition magazine for storing rounds of ammunition, comprising: an outer storage loop of an endless construction for storing a first set of rounds of ammunition; the outer loop having a pair of turns and a pair of generally straight reaches extending between its turns; an inner storage loop of an endless construction within the outer loop for storing a second set of rounds of ammunition; the inner loop having a pair of turns and a pair of generally straight reaches extending between its turns and respectively nested with the pair of straight reaches of the outer loop; and a separator plate that separates the reaches of the inner loop from each other to permit movement of the loops with the reaches of the inner loop moving in opposite directions to each other.

4,873,912

HYDRAULIC DRIVING ARRANGEMENT

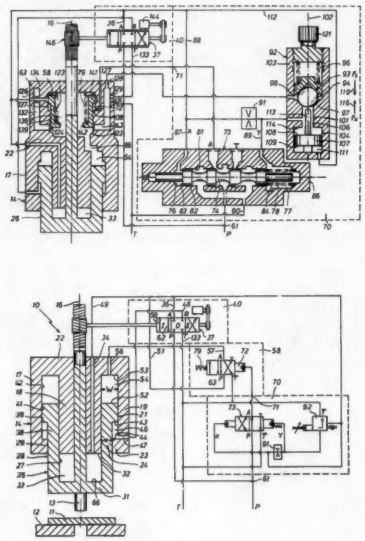
Eckehart Schulze, Weissach, Fed. Rep. of Germany, assignor to Hartmann & Lammle GmbH & Co. KG, Fed. Rep. of Germany

Filed Jun. 9, 1983, Ser. No. 502,552

Claims priority, application Fed. Rep. of Germany, Jun. 9, 1982, 3221758

Int. Cl.[4] F15B *13/16*

U.S. Cl. 91—389 **25 Claims**



1. A hydraulic driving arrangement for a machine element processing a workpiece and performing an operating cycle composed of a rapid feed motion directed towards the workpiece, followed by a working stroke effected in the same direction and serving to process the workpiece, and finally an oppositely directed rapid return motion, with a hydraulic cylinder serving as driving element and comprising at least three working services respectively defining each delimiting a face of a first, a second and a third pressure chamber, a rapid feed motion and a rapid return motion of the piston of the hydraulic cylinder for the machine element being controllable by an alternate admission and release of pressure to and from the first and the second pressure chambers of the hydraulic cylinder, while a feeding power can be increased, if necessary to perform the working stroke, by admitting pressure to the third pressure chamber of the hydraulic cylinder delimited by the said third working surface, characterized in that for motion control of the machine element with respect to direction and lift a hydraulic control circuit is provided, the hydraulic control circuit comprising a hydromechanical actual-value feedback device adapted to be supplied with pre-setting signals characteristic of at least end positions of the machine element for presetting the desired values, said hydraulic control circuit effecting both an alternative supply of pressure to the first and the second pressure chambers and, if necessary, the supply of pressure to the third pressure chamber; that for changing over the hydraulic cylinder from rapid-feed motion to the working stroke a reversing valve with hydraulic pilot valve is provided which, in a first flow position corresponding to the rapid-feed motions, connects the third pressure chamber of the hydraulic

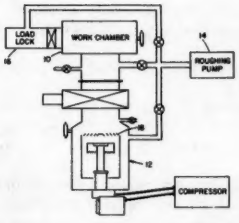
cylinder with a tank of a pressure supply source, and, in a second flow position connects the same pressure chamber with the a pressure outlet of a final control element of the control circuit; and that, for controlling the reversing valve, a pilot control valve arrangement is provided which responds to a output pressure P_A of the hydraulic control circuit and which moves the reversing valve into a second flow position when said output pressure P_A exceeds a pre-determined threshold P_{s1}, and returns the reversing valve into a first flow position when the output pressure P_A of the control circuit has dropped to a value P_{s2} corresponding maximally to a value $P_{s1} \cdot A1/A_L$, wherein: A_1 is a size of a surface of a piston upon which the output pressure P_A of the hydraulic control circuit acts during rapid-feed motion of the hydraulic cylinder and A_L is a size of an overall surface of a piston upon which the controller output pressure P_A acts during the working stroke of the hydraulic cylinder.

4,873,913

DRY ROUGHING PUMP HAVING A GAS FILM BEARING

Gerald R. Pruitt, Mendon, and Peter Bertsch, Harvard, both of Mass., assignors to Helix Technology Corporation, Waltham, Mass.

Filed Sep. 12, 1986, Ser. No. 906,741
Int. Cl.[4] F01B *31/10, 31/00*
U.S. Cl. 92—158 **26 Claims**



1. A vacuum pump assembly coupled to draw a vacuum and comprising a piston assembly positioned for axial movement within a cylinder with an evacuation space at one end thereof and separated from the cylinder by an oil free clearance seal, a source of pressurized gas; said pressurized gas being applied to the clearance seal to provide an air bearing.

4,873,914

CLEAN ROOM SYSTEM AND UNIT FOR THE SAME CLEAN ROOM SYSTEM

Shoji Hirayama, Yamato, Japan, assignor to Hirayama Setsubi Kabushiki Kaisha, Japan

Filed Feb. 4, 1988, Ser. No. 152,367
Int. Cl.[4] F24F *9/00*
U.S. Cl. 98—31.6 **1 Claim**

1. A clean room system comprising:

a plurality of cleaning units each comprising:

a conduit having a substantially inverted L-shaped cross-section defining a hollow ceiling and a hollow wall extending from a rear end of said ceiling to a floor, the hollow wall communicating at an upper end thereof with the hollow ceiling and at a lower end threof with the floor of the room to create an air flow path for directing air from said hollow wall through said hollow ceiling and into said room and recirculating air from said room through said floor and into said hollow wall;

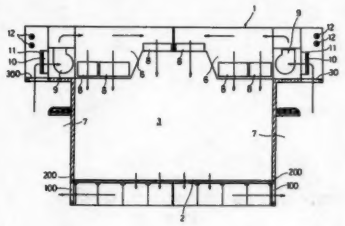
an air purifying filter disposed at a front end of the hollow ceiling to purify air passing between said hollow ceiling and said room;

an air fan located in said hollow ceiling upstream of said filter in said air flow path;

an air conditioner control unit located in the rear end of the hollow ceiling adjacent to and upstream of said air fan in said air flow path;

cold water supply and return conduits for providing communication between said air conditioner control unit and a cold water supply source located outside said room, said cold water supply and return conduits having a predetermined length and being located at the rear end of said hollow ceiling upstream of said air conditioner in the air flow path; and

each cleaning unit being connected laterally and longitudinally to an adjacent cleaning unit at ends and sides of



the hollow ceiling and hollow wall of each cleaning unit;

a corresponding plurality of hollow floor systems each connected for communicating with a hollow wall of a corresponding cleaning unit;

opposing wall plates each connected to an endmost cleaning unit and corresponding floor system to define an enclosed room; and

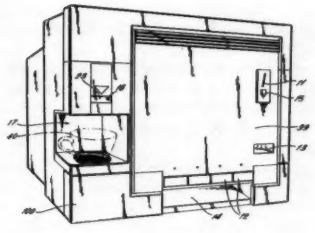
connecting means for connecting the cold water supply and return conduits of one cleaning unit with the corresponding cold water supply and return conduits of an adjacent cleaning unit, the cold water supply and return conduits of one endmost cleaning unit being connected to said cold water supply source.

4,873,915

BEVERAGE PREPARING MACHINES

Alec T. Newman; Andrew C. Bentley; Christine A. King, all of Banbury; Alistair J. MacMahon, Northants; Robert W. Tansley, and Andrew R. Gibbs, both of Warwickshire, all of United Kingdom, assignors to General Foods Limited, Banbury, England

Filed Mar. 15, 1989, Ser. No. 324,150
Claims priority, application United Kingdom, Mar. 21, 1988, 8806670
Int. Cl.[4] A47J *31/00*
U.S. Cl. 99—289 R **16 Claims**



1. A machine for preparing a beverage by employing a

package (10;200) containing at least one beverage ingredient comprising a point of entry (16;209) for the package into the machine, a brewing station within the machine at which the package is supplied with an aqueous medium to produce the required beverage, and drive means (24;217, 221, 222) which engage the package at the point of entry and convey the package to the brewing station, characterised in that the drive means includes a coupling between a drive part (24;226) and a part (30;252) associated with the package, the coupling enabling the drive to the package to be engaged and disengaged and allowing the part (30;252) associated with the package to move independently of the drive part (24;226).

4,873,916

METHOD AND DEVICE FOR THE PREPARATION OF COFFEE

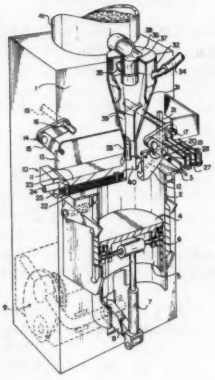
Petrus J. C. Piscaer, Rotterdam, Netherlands, assignor to De Erven De Weduwe J. Van Nelle B.V., Netherlands

Filed Feb. 12, 1988, Ser. No. 155,554

Claims priority, application Netherlands, Feb. 4, 1987, 8700455; Nov. 26, 1987, 8702837

Int. Cl.[4] A47J *31/00*

U.S. Cl. 99—289 R 22 Claims



1. Device for preparing coffee comprising:

a cylindrical container having an open top and a vertically reciprocable piston forming the underside of the container,

a filter and means for moving the filter between a position closing the open top of said container to allow brewed coffee to be expelled therethrough and a position exposing the container to the introduction of ground coffee and hot water,

and supply means for supplying ground coffee and hot water into the open top of the container in substantial vertical direction only so that hardly any turbulence will occur in the container and the ground coffee will come to float on the hot water, the supply means being equipped to mix coffee and water.

4,873,917

APPARATUS FOR CONTINUOUSLY COOKING RICE BY STEAMING

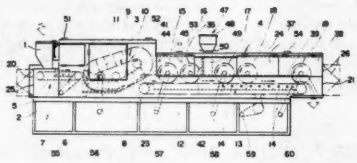
Tuyoshi Sugimura, Tokyo; Kenji Hori, and Kiyoyuki Oba, both of Kobe, all of Japan, assignors to Iseki Food Engineering Kabushiki Kaisha, Tokyo and Kabushiki Kaisha Horiken, Hyogo, both of, Japan

Filed Oct. 18, 1988, Ser. No. 259,195

Claims priority, application Japan, Oct. 19, 1987, 62-263533

Int. Cl.[4] A47J *37/12*

U.S. Cl. 99—355 5 Claims



1. An apparatus for continuously cooking rice by steaming comprising:

a tank for storing rice after being immersed in water;

a first conveyor for conveying rice supplied from said tank;

a primary steaming unit for exposing rice being conveyed on said first conveyor to steam;

a water tank for immersing rice discharged from said first conveyor to water at a high temperature;

conveying means for forwardly conveying rice in said water tank;

a second conveyor for conveying rice discharged from said water tank;

a seasoning liquid feeder provided above an inlet end of said second conveyor for suppling a seasoning liquid such as salt, shoyu, sake, vinegar, edible oil to rice being conveyed;

an ingredient feeder provided above an inlet end of said second conveyor for supplying vegetables, meat, fish and other ingredients to rice being conveyed; and

a secondary steaming unit disposed behind said seasoning liquid feeder and ingredient feeder for exposing rice being conveyed on said second conveyor to steam.

4,873,918

STRAINER POT WITH WHISTLING SPOUT

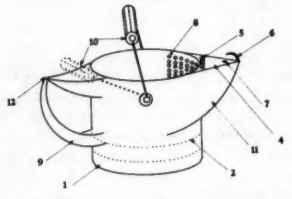
Geri I. Goldman, 340 Wixon Pond Rd., Mahopac, N.Y. 10541

Filed Aug. 22, 1988, Ser. No. 234,515

Int. Cl.[4] A47J *27/212, 27/21*

U.S. Cl. 99—403 7 Claims

FIGURE 1



1. A utensil facilitating the boiling and straining of food items, which also alerts the user when the water comes to a boil, is manufactured of a heat safe material comprising of:

a cylindrical pot with perforations in an upper area and a plurality of measuring intervals on the inside circumference,

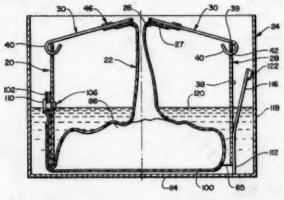
a spout which is attached to said pot over said perforated area,
a spout cover hinged to top of said spout,
a removable pot lid which fits on top of said pot,
a fixed pot handle which is attached vertically and opposite said spout to said pot,
a rotating pot handle which is attached so same pivots about said pot.

4,873,919

DISPOSABLE BAGS

Alexander P. Janssen, c/o Data Visible, P.O. Box 7767, Charlottesville, Va. 22901

Continuation of Ser. No. 145,516, Jan. 19, 1988, abandoned. This application Apr. 28, 1989, Ser. No. 346,271
Int. Cl.[4] A47G *27/10*
U.S. Cl. 99—403 **16 Claims**



1. The combination of a cooking utensil accessory and a cooking bag which can be used in association with said accessory and in a cooking vessel to facilitate the cooking of comestibles in said bag, said accessory including: a base which is adapted to be supported in said cooking vessel and a plurality of inwardly extending elements fixed to said base for concomitant pivotable movement relative thereto, there being bag engageable means at the inner ends of said elements to which the bag can be attached at an opening defining edge thereof, whereby said elements can be concomitantly rotated toward each other to constrict the opening during the cooking of the comestibles and away from each other to enlarge the opening and furnish access to the comestibles in the bag, and there being witness marks around the periphery of the bag at the opening defining edge thereof at equal intervals corresponding to those between the bag engageable inner ends of said pivotable, inwardly extending elements to identify locations around said periphery where the bag engageable means of the inwardly extending elements can be so attached to said bag as to provide equal lengths of bag material between each pair of adjacent elements and thereby permit said bag to be fully opened by the concomitant rotation of said inwardly extending elements away from each other.

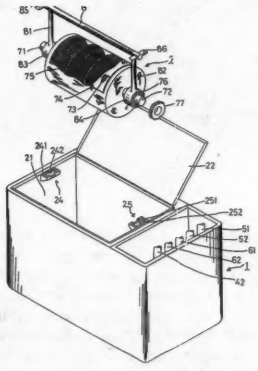
4,873,920

VACUUM FRYING AND OIL SEPARATING DEVICE

Chen-Shi Yang, No. 2, Lane 1558, Ming-Chueng E. Road, Taipei, Taiwan

Filed Jun. 10, 1988, Ser. No. 205,348
Int. Cl.[4] A47J *37/12*
U.S. Cl. 99—409 **4 Claims**

1. A vacuum frying and oil separating device comprising:
(a) a vessel-shaped outer case having an inner space defining a frying compartment provided with an opening and a lid for closing off the opening in an airtight manner;
(b) a pair of support projectors disposed on opposite walls of the frying compartment, each projector including a recess formed in a top surface thereof;
(c) a portable container unit disposable within the frying compartment and including a case formed of wire net for containing raw materials to be fried, a port hole in the case, a lid for closing the port hole, a pair of shafts extending laterally from opposite sides of the case, a handle having spaced connecting means for rotatably suspending the case by the shafts, a pair of support plates extending transversely at opposite ends of the handle for engagement within the recesses of the projectors, and a first gear secured on one shaft;
(d) a driving means including a variable speed reversible motor disposed within the inner space and including a drive shaft extending substantially horizontally into the frying compartment, and a second gear on the drive shaft for intermeshing engagement with the first gear;
(e) means for removing air from the frying compartment;
(f) means for supplying heated oil to the frying compartment and withdrawing oil therefrom; and
(g) a water cooler including a cooling coil attached to the drying compartment for cooling the oil contained therein.

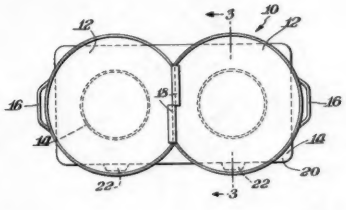


4,873,921

MULTIPLE UNIT WOK APPARATUS

Robert A. Piane, Sr., Wilmington, Del., assignor to Piane Caterers, Inc., Wilmington, Del.

Filed Jul. 14, 1988, Ser. No. 219,557
Int. Cl.[4] A47J *37/10*
U.S. Cl. 99—422 **5 Claims**



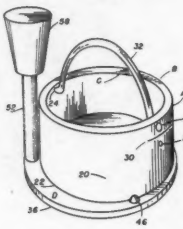
1. Multiple unit wok apparatus comprising at least two similar wok bowls detachably affixed together at an intersecting joint therebetween by interlocking connector clamp means, said intersecting joint being arcuate downwardly when said apparatus is in the cooking position, thereby allowing cooked or partially cooked foods and juices to be shifted easily from one wok bowl to another by the cook, using a spoon, spatula or other appropriate tool, with substantially no spillage.

4,873,922

COMBINED EGG POACHER AND SERVING PLATE

Franklyn G. Umholtz, 644 Riverview Rd., Flagler Beach, Fla. 32036

Filed Sep. 6, 1988, Ser. No. 241,065
Int. Cl.[4] A47J *43/18*
U.S. Cl. 99—426 5 Claims



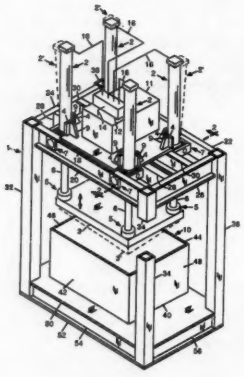
1. A poaching device comprising a body member defining a poaching chamber and having a smooth undersurface, and a plate member having a smooth upper surface complementing said body member undersurface for supporting said body member and forming a semi-tight seal between said body and plate members, a small flow-controlling orifice extending from the outside and communicating with said chamber spaced from said undersurface wherein said orifice has a diameter of about 0.0625 inch.

4,873,923

HYDRAULIC PRESS PLATON SUPPORT

Douglas E. Manning, 7300 Rule Rd., Knoxville, Tenn. 37920

Continuation-in-part of Ser. No. 864,294, May 16, 1986, abandoned. This application Aug. 29, 1988, Ser. No. 239,040
Int. Cl.[4] B30B *1/08, 1/34*
U.S. Cl. 100—258 R 2 Claims



1. In a hydraulic press having a press frame, at least four hydraulic cylinders mounted to said press frame, a cylinder rod in each of said cylinders, a platen supported by said cylinder rods, a hydraulic fluid pumping means, and a hydraulic flow dividing means providing near equal hydraulic flow to activate each of the cylinders, a platen support arrangement comprising:

a swivel joint connection between each of said cylinders and said press frame, said swivel joint connections thus allowing pivotal movements in directions perpendicular to the longitudinal axis of said cylinders;

a swivel joint connection between each of said cylinder rods and said platen, said swivel joint connections thus allowing pivotal movement in directions perpendicualr to the longitudinal axis of said cylinders; and

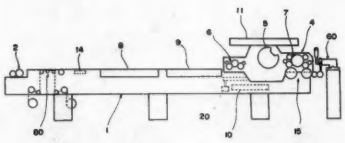
stop means located on said press frame for restraining said hydraulic cylinders, thus limiting swivel movement.

4,873,924

FLAT-BED PRESS AND FLAT-BED PRINTING METHOD

Tsutomu Nonomura, and Hidetoshi Abe, both of Tokyo, Japan, assignors to Toyo Ink Manufacturing Co., Ltd., Tokyo, Japan

PCT No. PCT/JP87/00879, § 371 Date Jun. 21, 1988, § 102(e) Date Jun. 21, 1988, PCT Pub. No. WO88/03478, PCT Pub. Date May 19, 1988
PCT Filed Nov. 11, 1987, Ser. No. 233,656
Claims priority, application Japan, Nov. 12, 1986, 61-267729; Nov. 20, 1986, 61-275181; Sep. 17, 1987, 62-233193
Int. Cl.[4] B41F *3/34*
U.S. Cl. 101—146 5 Claims



1. A flat-bed press wherein a carriage including an ink roller, a dampening roller and a blanket is moved on a press body frame provided with a plate bed, a paper bed, and a dampening unit and an inking unit which are at both ends of said press body frame, comprising (a) a table on which the materials to be printed are placed, a feed head having one or more suckers for retaining thereon a material to be printed, and a transfer means for moving said feed head and carrying said material to be printed which is held on said suckers to a paper bed, all of which parts are provided in said press body frame, (b) a means for setting the number of materials to be printed, (c) a blanket washing unit provided in said press body frame and adapted to wash said blanket in said carriage after the completion of each color printing of a designated number of materials, (d) an ink washing unit adapted to wash said ink roller in said carriage and said inking unit in said press body frame, and consisting of a washing oil supply unit provided in said carriage, and a scraping doctor provided in said press body frame, (e) an ink supply unit having an ink supply roller consisting of an ink distributing roller member and an ink oscillating roller member, and an ink supply means adapted to be moved reciprocatingly along said ink distributing roller member and provided with a plurality of ink discharge nozzles the number of which is in accordance with that of the colors of the ink in use.

4,873,925

SPRAY NOZZLE AND VALVE ASSEMBLY

Sten Hultberg, Löddeköping, and Birger Hansson, Akarp, both of Sweden, assignors to Jimek International AB, Malmo, Sweden

Filed Jan. 19, 1988, Ser. No. 145,327
Int. Cl.[4] B41F *7/30;* B41L *25/06*
U.S. Cl. 101—147 14 Claims

1. In a printing apparatus comprising a rotary roll and a spray dampener for spraying liquid onto said roll, said spray dampener comprising a plurality of liquid sprayer assemblies spaced along the length of said roll for directing overlapping sprays toward said roll, each sprayer assembly comprising:

valve means,

nozzle means including a liquid spray outlet at a front end

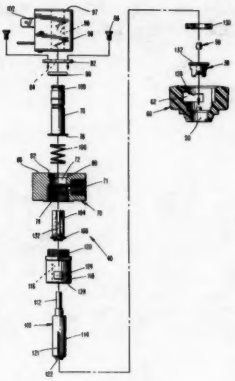
thereof and a valve seat at a rear end thereof, said nozzle means directed toward said roll, and

means releasably mounting said nozzle means to said valve means,

said valve means comprising:

a valve housing including a throughbore communicating with a liquid inlet,

a solenoid plunger slidably mounted in said throughbore for reciprocable movement therein, and



a valve stem removably mounted at a front end of said plunger and including a front sealing surface arranged to contact said valve seat,

said valve seat, said valve stem, said plunger, and said nozzle means being coaxially arranged,

said valve stem being detachable from said plunger in response to the application of suitable force to a front end of said valve stem,

said throughbore being wide enough to permit forward removal of said valve stem from said plunger when said nozzle means is removed from said valve means.

4,873,926

CLAMPING GRIPPER WITH RESULTANT FORCE THROUGH CONTACT POINT

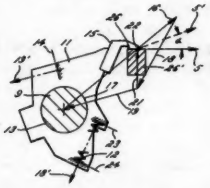
Claus Simeth, Offenbach am Main, and Valentin Gensheimer, Muhlheim am Main, both of Fed. Rep. of Germany, assignors to MAN Poland Druckmaschinen AG, Fed. Rep. of Germany

Filed Sep. 25, 1987, Ser. No. 101,287

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1986, 3632768

Int. Cl.[4] B41F *21/04, 1/30*

U.S. Cl. 101—409 **1 Claim**



1. A clamping gripper for a sheet-fed rotary press having an oscillating gripper actuating shaft, said clamping gripper comprising, in combination:

a gripper support;

a main gripper member moveable between a gripping position and a non-gripping position and having a gripper finger urged toward said gripper support at a transfer point and effecting a load force thereon when said main gripper member is in said gripping position;

clamping means for securing said main gripper member to said gripper shaft, said clamping means including a generally radially extending post and a generally radially extending stop lug;

spring means interposed between said main gripper member and said post for exerting a first tangentially extending force;

and adjusting screw means disposed between said main gripper member and said stop lug for effecting a second tangentially extending force when said gripper member is in said non-gripping position;

said first and second tangentially extending forces being disposed so that the resultant of said forces intersects said transfer point when said gripper member is in said non-gripping position;

said load force and said first tangentially extending force being disposed so that this resultant force intersects said transfer point when said gripper member is in said gripping position; and

said main gripper member having a circumferentially closed bore surrounding said gripper actuating shaft with the contact point therebetween disposed substantially along the line of said resultant forces.

4,873,927

PYROTECHNIC FUZE FOR PROJECTILES, ROCKETS, BOMBLETS AND MINES

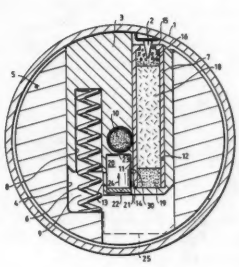
Werner Rudenauer, Roth, Fed. Rep. of Germany, assignor to DIEHL GmbH & Co., Nuremberg, Fed. Rep. of Germany

Filed Nov. 29, 1988, Ser. No. 277,272

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1987, 3740966

Int. Cl.[4] F42B *13/50*; F42C *15/04, 15/22*

U.S. Cl. 102—269 **3 Claims**



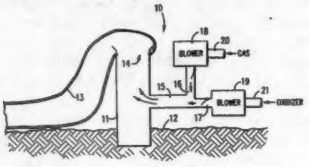
1. A pyrotechnic fuze for projectiles, rockets, bomblets and mines, including a transversely movable housing of a slider; triggering means for a delay detonator and an explosive charge triggering detonator in said housing, said delay detonator being arranged transversely of the detonator; and a transmission detonator being arranged in the slider in parallel with the delay detonator intermediate the explosive charge triggering detonator and a transfer composition for the delay detonator for the triggering of an explosive charge, said slider including a passageway section at the transfer detonator communicating with a gas expansion space intermediate said slider and a guideway for said slider.

4,873,928

NUCLEAR-SIZED EXPLOSIONS WITHOUT RADIATION

Frank E. Lowther, Plano, Tex., assignor to APTI, Inc., Los Angeles, Calif.

Filed Jun. 15, 1987, Ser. No. 62,020
Int. Cl.[4] F42B 3/00
U.S. Cl. 102—323 15 Claims



1. A method for producing a violent and destructive explosion having high shock energies comprising:

partially filling an expendible structure with an initial mixture of combustible gas and an oxidizer gas in concentrations rich in said combustible gas so that said initial mixture is incapabale of burning or exploding;

mixing additional oxidizer gas into said initial mixture after said initial mixture is in place and contained within said structure to thereby create an explosive mixture within said structure; and

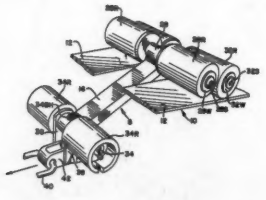
detonating said explosive mixture to produce said explosion and thereby destroying said expendible structure.

4,873,929

PUSHER UNIT

Frank J. Witecki, 3885 Harrison St., Gary, Ind. 46408

Filed Apr. 2, 1987, Ser. No. 34,388
Int. Cl.[4] B61B 10/04, 13/12
U.S. Cl. 104—172.3 6 Claims



1. A pusher unit for use on an endless-chain conveyor for transporting a vehicle forwardly along a generally horizontal, slotted track positioned above the chain by engaging a tire of the vehicle, comprising:

a straight metal bar having a front end which is adapted to be coupled to the endless chain and a free end which is adapted to project out of a slot in the track;

a pair of transverse axle members affixed to said bar and extending to either side of said bar, one of said axle members being affixed at one of the bottom or top surfaces of said bar near its free end, and the other being affixed to the other of the bottom or top surfaces a short distance forward of the first axle, each of said axles being positioned at a right angle to said bar so as to be transverse to the track slot, said axle members each extending sideways from the bar by a fixed distance;

four roller sleeves mounted for rotation about said axle members, one roller sleeve being mounted on each side extension of said axles, said sleeves having a central bore sized to secure the axle member in a loose fit;

means at the front end of said bar for receiving a third cylindrical axle member, said means and axle member being bolted together through holes formed in both; and

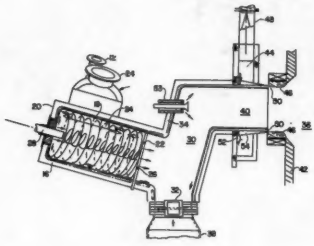
a pair of rollers mounted for rotation about the third axle member, one on either side of the bar.

4,873,930

SULFUR REMOVAL BY SORBENT INJECTION IN SECONDARY COMBUSTION ZONES

Andrea L. F. Egense, Cerritos, and John D. Kuenzly, Redondo Beach, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Continuation of Ser. No. 252,035, Sep. 29, 1988, abandoned, which is a continuation of Ser. No. 79,373, Jul. 30, 1987, abandoned. This application Mar. 7, 1989, Ser. No. 319,803
Int. Cl.[4] F23J 11/00
U.S. Cl. 110—345 56 Claims



1. In an apparatus for combustion of sulfur-containing particulate carbonaceous fuel wherein oxidizer gas and particulate fuel are introduced into a substantially cylindrical primary combustion chamber and wherein the input velocities, mass-flow rates and combustion temperatures are regulated to minimize the concentration of volatilized and liquid slag in the output gaseous products of combustion, and wherein the walls of the combustion chamber are maintained within a temperature range such that a layer of solidified slag is retained on the inside surfaces of the walls, the improvement comprising, in combination:

(a) means for preheating said oxidizer gas and introducing the preheated oxidizer gas into said chamber in a manner to establish a high-velocity swirling flow of a mixture comprising oxidizer and combustion products within said chamber;

(b) means for injecting particulate fuel into said chamber near the center of one end thereof in a pattern such that substantially all of the fuel particles are intercepted by said swirling flow and most of the carbon contained in the particles is converted to oxides of carbon before the particles reach the walls of the chamber;

(c) means regulating the oxidizer and fuel input velocities and mass-flow rates for maintaining a relatively fuel-rich combustion regime within a longitudinally-extending central portion of the primary combustion zone within said chamber, providing a relatively oxygen-rich annular region adjacent the walls, driving substantially all the slag content of the fuel to the walls of the chamber and keeping the temperature of the gaseous combustion products substantially higher than the ash-fusion temperature of the non-combustible constituents of the fuel;

(d) slag recovery means comprising a slag-recovery chamber coupled to receive combustion products from said primary combustion chamber for collecting substantially all liquid slag entrained in said combustion products, separately disposing of all slag collected in the system, and

conducting thermal energy-carrying gaseous products to an associated heat utilization equipment;

(e) sulfur-capture means for combining with said gaseous products, substantially as such products enter the heat utilization equipment,

(i) sufficient calcium-containing sorbent to provide a calcium-to-sulfur molar ratio in the range from about 2 to about 5 and

(ii) sufficient supplementary oxidizer to keep the temperature at which said sorbent initially contacts sulfur constituents of the gaseous products within the range from about 1600° F. to about 2300° F;

(f) with said sulfur-capture means comprising sorbent injection means for introducing calcium-containing sorbent into the gaseous products downstream from said primary combustion zone and before such products pass into the heat-utilization equipment, and oxidant addition means for adding supplementary oxidant to said gaseous products after removal of substantially all non-combustible mineral constituents therefrom, and with said sorbent injection means and oxidant addition means being operative to maintain a time-temperature profile for the sorbent particles in transit to and through the heat utilization equipment such that the sulfur sorbent reacts with and captures a preponderance of the sulfur constituents at an effective capture temperature of less than about 2300° F., while maintaining a stoichiometry in the heat utilization equipment of from about 1.1 to about 1.3.

4,873,931

PROGRAMMED THREAD REGULATING APPARATUS FOR A SEWING MACHINE

Katsumi Takagi; Toshihito Negoro, and Itaru Tamagawa, all of Osaka, Japan, assignors to Pegasus Sewing Machine Mfg. Co., Ltd., Osaka, Japan

Filed May 10, 1988, Ser. No. 192,093

Claims priority, application Japan, May 11, 1987, 62-114971

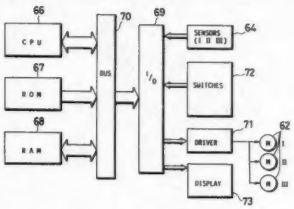
Int. Cl.[4] D05B *19/00, 47/04*

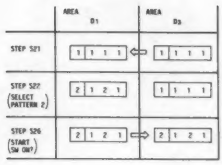
U.S. Cl. 112—121.11 **17 Claims**

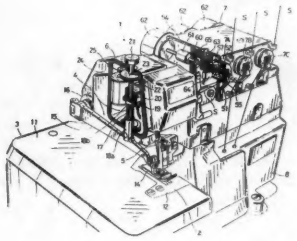
1. A thread regulating apparatus for a sewing machine to make a seam by using plural threads simultaneously, having a plurality of thread regulators each nipping the thread to apply tension to the thread, the tension being variable by changing a nip pressure, said apparatus comprising:

memory means, comprising a RAM, for storing combination patterns of tension values of the threads, each tension value being applied by its respective thread regulator according to the balance of the tension values between the regulators,

selecting means for selecting one of the combination pattern stored in said memory means, and







adjusting means for adjusting the nip pressure of each thread regulator individually in accordance with the selected combination pattern.

4,873,932

STEPPER DRIVEN STITCH PATTERNING MECHANISM FOR SEWING MACHINES USING SPIRAL CAM GROOVE AND FOLLOWER

Kenneth D. Adams, Madison, N.J., assignor to SSMC Inc., Fairfield, N.J.

Filed Feb. 1, 1989, Ser. No. 304,540

Int. Cl.[4] D05B *3/02*

U.S. Cl. 112—443 **7 Claims**

1. In a sewing machine having a frame, stitch forming mechanism carried in said frame for stitch forming and stitch pattern influencing motion, a stepper motor secured in said sewing machine frame, and drive mechanism responsive to actuation from said stepper motor for imparting said stitch pattern influencing motion to said stitch forming instrumentality, said drive mechanism comprising:

a cam supported in said sewing machine frame, and having an axis of rotation,

a drive connection between said stepper motor and said cam,

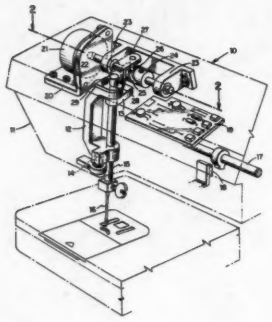
a spiral cam groove formed in said cam and extending radially of the axis of rotation of said cam,

a cam follower having a free extremity adapted to track said cam groove,

a cam follower support operatively associated with said

stitch forming instrumentality, said cam follower carried on said cam follower support in a position extending substantially radially of said cam rotation axis,

said cam groove and said follower extremity each having different cross sectional shapes, said shapes being interrelated to provide simultaneous point contact of the cam follower with each side of said cam groove, and spring means biasing said cam and said cam follower into engagement to maintain said point contact of said cam follower with each said of said cam groove.



4,873,933

FLOAT-FREE ARRANGEMENT FOR MARINE RADIO DISTRESS BEACONS

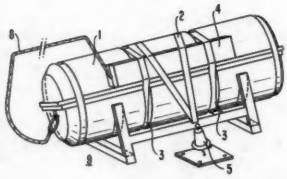
Brian S. Bennett, Hertfordshire, and David Smith, Kent, both of England, assignors to Clifford & Snell Limited, Surrey, England

Filed Oct. 31, 1988, Ser. No. 264,885

Claims priority, application United Kingdom, Oct. 30, 1987, 8725512

Int. Cl.[4] B63C *9/22*

U.S. Cl. 441—36 **6 Claims**



1. A marine radio distress beacon in combination with an automatic self-inflating life-raft, the life-raft having a casing and retaining straps encircling the casing, the retaining straps being breakable by force resulting from self-inflation of the life-raft, the distress beacon being mounted on an exterior surface of the casing so as to be retained thereon by at least one of the said retaining straps so as to be released on breakage of the straps.

4,873,934

ADJUSTABLE SHEET FOR A WINDSURFING HARNESS

Greg Renault, P.O. Box 832, La Jolla, Calif. 92038

Filed Jun. 17, 1988, Ser. No. 214,214

Int. Cl.[4] B63B *35/00*

U.S. Cl. 114—39.2 **2 Claims**

1. An adjustable sheet for a windsurfing harness on a boom of an articulated mast of a windsurfing board comprising:

an elastic means, one end of which is securely attached to said boom,

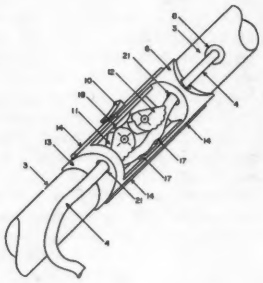
a sheet which is attached to the other end of said elastic means,

a dual-action clamp through which said sheet is routed,

said dual-action clamp having a pair of mirror symmetrical cams,

a multiplicity of serrated poles at the extremity of each of said cams to lock said sheet,

a pivot means attaching said cams to said dual-action clamp,



a spring means to tension to said cams against said sheet, and

a quick release means to disengage said dual action clamp, so that in said dual-action clamp, said poles of said cams are tensioned through said pivots against said sheet locking said sheet in place so said sheet can not slide in either direction, and by actuating said quick release means, the sheet is disengaged from said dual-action clamp and said sheet may be elongated or shortened in accord with the tension of the elastic means to accommodate a new position of the boom and articulated mast.

4,873,935

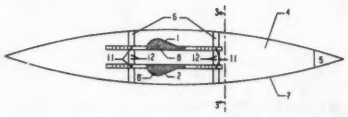
COMBINED CANOE SEAT AND PORTAGE YOKE

Robert S. Lustig, Rte. 3, Box 194, Berkeley Springs, W. Va. 25411

Filed Sep. 4, 1987, Ser. No. 93,238

Int. Cl.[4] B36B *17/00*

U.S. Cl. 114—347 **15 Claims**



1. A combined canoe seat and portage yoke which comprises:

fore and aft support members transversely extended across the width of the canoe and spaced longitudinally apart along the length of the canoe,

first and second saddle yoke portions each having means for engaging said fore and aft support members,

said fore and aft support members comprising first mounting means for locating said saddle yoke portions in respective first positions defining a seat configuration wherein said saddle yoke portions are:

generally horizontal, longitudinally extended, disposed at a level above the bottom of the canoe, and spaced substantially contiguous with each other; whereby a paddler may straddle said saddle yoke portions and utilize the combined breadth of said portions to comfortably support the buttocks while sitting or kneeling in the canoe,

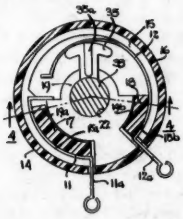
said fore and aft support members comprising second mounting means for locating said saddle yoke portions in respective second positions defining a portage yoke configuration wherein said saddle yoke portions are: generally horizontal, longitudinally extended, disposed at a level above the bottom of the canoe, and spaced laterally apart from each other on generally opposite sides of the canoe; whereby said saddle yoke portions will define two support surfaces for engagement by the shoulders of a carrier when the canoe is inverted for transport.

4,873,936

SWITCHING MECHANISM FOR ANTI-THEFT SYSTEM

Robert J. Ponticelli, 20274 Delita Dr., Woodland Hills, Calif. 91364

Filed Oct. 31, 1988, Ser. No. 265,404
Int. Cl.[4] B60R *27/00*
U.S. Cl. 116—33 7 Claims



1. A switching mechanism for use in a theft alarm system for providing an alarm signal when an attempt is made to remove equipment being protected thereby, said alarm system being actuated by providing power from a power source through said switching mechanism to an alarm device when a predetermined piece of hardware is removed from the equipment, said mechanism comprising:

a casing having an aperture formed therein and extending completely therethrough;

first and second spring contact members retained in said casing;

a camming member slidably mounted in said casing;

said first spring contact member abutting against said camming member and urging said camming member towards said aperture,

said piece of hardware being fitted into said aperture in abutment against said camming member so as to urge said camming member away from said aperture, thereby retaining said first spring contact member in a first predetermined position;

the camming member being permitted to be driven by said first spring member into said aperture with said first spring contact member in a second predetermined position;

said first spring contact member being in contact with said second spring contact member in one of said predetermined positions and not being in contact with said second spring contact in the other of said predetermined positions;

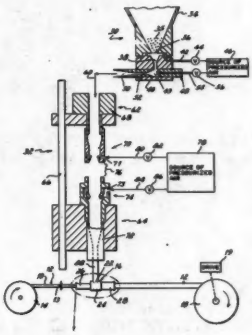
whereby when said piece of hardware is removed from the equipment, said alarm system is actuated.

4,873,937

METHOD AND APPARATUS FOR SPRAYING POWDER INTO A CONTINUOUS TOW

John J. Binder, Lorain, and Thomas A. Kaiser, Vermilion, both of Ohio, assignors to Nordson Corporation, Westlake, Ohio

Filed Jan. 28, 1988, Ser. No. 149,539
Int. Cl.[4] B05B *15/12*
U.S. Cl. 118—44 8 Claims



1. Apparatus for spraying particulate powder material into an axially moving tow formed of individual strands, comprising:

a spraying chamber having a hollow interior with a longitudinal axis, said spraying chamber being formed with a powder inlet port and a vent;

a hollow inlet guide and a hollow outlet guide each connected to said spraying chambered communicating with said hollow interior thereof, said hollow inlet guide being adapted to receive a tow which is axially movable through said spraying chamber and out said hollow outlet guide;

a powder spray device mounted to said powder inlet port of said spraying chamber, said power spray device having a discharge outlet which is oriented at an angle relative to said longitudinal axis of said spraying chamber and which is located on one side of said tow movable axially through said spraying chamber, said powder spray device being effective to spray a stream of air-entrained particulate powder material through said powder inlet port into said hollow interior of said spraying chamber at a velocity such that individual strands of the tow are separated from one another with said spraying chamber and the particulate powder material is lodged between the exterior surface of adjacent strands throughout substantially the entire thickness of the tow.

4,873,938

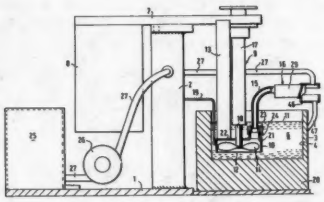
SOLDERING APPARATUS

Alexander J. Cinigilo, Holly Lodge, Ridgeway, Hutton Mount, Brentwood, England

Filed Jun. 26, 1986, Ser. No. 878,776
Claims priority, application United Kingdom, Jul. 10, 1985, 8517452; Oct. 22, 1985, 8526016; Mar. 5, 1986, 8605389; Jun. 3, 1986, 8613400
Int. Cl.[4] B05C *5/02, 5/04*
U.S. Cl. 118—302 6 Claims

1. Apparatus for applying solder to a wire or a connecting lead of an electrical or electronic component, comprising a bath for containing molten solder, a pump, a nozzle, a conduit connecting the pump and the nozzle, the pump being arrange to pump solder from the bath to the nozzle via the conduit, wherein the nozzle has a downwardly directed exit such that solder is pumped out of the nozzle to form a downwardly flowing stream of solder, wherein the exit is located at an end

of the nozzle and guide means is provided for guiding a wire or lead to be soldered below the level of the exit, and wherein the



guide means comprises an arm extending laterally from the nozzle and a lower edge of the arm slopes upwardly away from the exit.

4,873,939

SHORT-DWELL COATER FOR COATING A WEB WITH COATING MIX

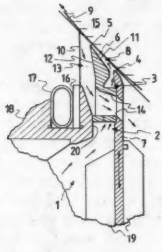
Juhani Eskelinen, Helsinki, Finland, assignor to Valmet Paper Machinery Inc., Helsinki, Finland

Filed Nov. 13, 1987, Ser. No. 120,476

Claims priority, application Finland, Nov. 14, 1986, 864649

Int. Cl.[4] B05C *3/02*

U.S. Cl. 118—410 **6 Claims**



1. A short-dwell coater for coating a web positioned against a backing roll, said web being coating with a coating mix as said web moves in a coating direction from a forward to a rear side of said coater, said short-dwell coater comprising:

a front lip;

an intermediate lip positioned behind said front lip;

a mouth piece formed by said front lip and said intermediate lip defining an application zone with said web whereat the coating mix is applied to the web, said front lip acts as a support for at least said intermediate lip and mouth piece;

means for moving said front lip toward and away from said web for adjusting size of the application zone;

feeder means for feeding the coating mix to the application zone, said feeder means being positioned next to said front lip; and

doctor blade means positioned rearwardly of said application zone for doctoring excess coating mix away from the web, said excess coating mix being kept separate from coating mix to be applied to the web, said intermediate lip having a side facing the doctor blade means which forms an obtuse angle with the web to prevent reflow of the excess coating mix to the application zone.

4,873,940

IMAGE DEVELOPING DEVICE

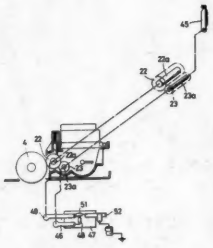
Toyoji Ishikawa, Kanagawa; Toshio Kaneko; Shuichi Endo, both of Tokyo; Yoshihiro Ogata, and Toshihiko Takaya, both of Kanagawa, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Oct. 23, 1986, Ser. No. 922,357

Claims priority, application Japan, Oct. 23, 1985, 60-0236979; Feb. 20, 1986, 61-023485[U]

Int. Cl.[4] G03G *15/08*

U.S. Cl. 118—651 **16 Claims**



1. An image developing device comprising:

a developing roller for supplying a thin layer of one-component toner to a latent image carrier;

a toner supply roller independently rotatable in abutting engagement and in pressure contact with said developing roller, said toner supply roller being electrically conductive;

said toner being triboelectrically charged by said toner supply roller; and

bias voltage distributing means for applying a voltage VB to said developing roller and a voltage VR to said toner supply roller, where both voltages are of the same polarity, VB being less than VR when the toner is positively chargeable, and VB being greater than VR when the toner is negatively chargeable.

4,873,941

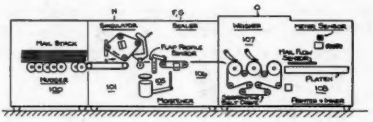
ENVELOPE FLAP MOISTENER

Kevin J. O'Dea, Sandy Hook, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 28, 1988, Ser. No. 291,097

Int. Cl.[4] B05C *1/02, 5/00*

U.S. Cl. 118—669 **4 Claims**

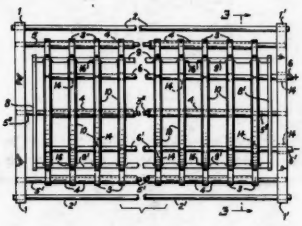


1. In a moistening arrangement for moistening the flap of an envelope moving in a first direction in a given plane, said flap having an edge, said arrangement having a nozzle directed to spray a liquid at an envelope flap along a given locus in said plane, a source of first signals that are a function of the position of said edge in said plane and means responsive to said first signals for moving said nozzle in a direction substantially parallel to said plane for moistening said flap at positions thereof; the improvement wherein said nozzle comprises a hollow needle having a bore sufficiently small that the flow of liquid therethrough is substantially independent of pressure applied to said liquid.

4,873,942
PLASMA ENHANCED CHEMICAL VAPOR DEPOSITION WAFER HOLDING FIXTURE

George M. Engle, Phoenix, Ariz., assignor to The Stackpole Corporation

Filed Jun. 8, 1988, Ser. No. 204,210
Int. Cl.[4] C23C *16/00, 14/00;* B05B *5/02;* B05C *5/00*
U.S. Cl. 118—728 15 Claims



1. A holding fixture for plasma enhanced chemical vapor deposition processing of semiconductor wafer workpieces comprising a frame boat assembly for holding workpieces to be subjected to a flow of reactant gases serially across the workpieces in a direction perpendicular to the broad faces of the workpieces and to the longitudinal axis of the boat, said boat including in combination;

a pair of upright, spaced-apart insulating frame end members having a first set of spaced-apart parallel, elongated, insulating rods secured between the end members for holding the boat in assembled relation;

an electrode supporting cradle secured within the boat for holding a plurality of flat, spaced-apart, electrically conductive electrodes in an upright position with the flat surfaces parallel to each other and perpendicular to the longitudinal axis of the boat;

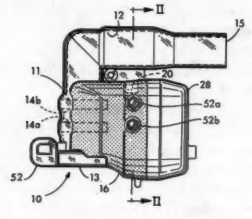
a workpiece holding rack comprised by at least two spaced-apart, parallel insulating workpiece support elongated rods each being seated in longitudinally aligned apertures formed on lower opposite sides of the periphery of the array of flat, spaced-apart, parallel electrically conductive electrodes for holding the workpieces flat against opposed flat surfaces of the respective electrodes; and

means for applying an electric potential difference between alternate ones of the array of spaced-apart, parallel electrically conductive electrodes.

4,873,943
MILK FLOW INDICATOR

Ronald J. Pulvermacher, Cottage Grove, Wis., assignor to Dairy Equipment Co., Madison, Wis.

Filed Dec. 28, 1987, Ser. No. 138,219
Int. Cl.[4] A01J *3/00*
U.S. Cl. 119—14.16 21 Claims



1. A milk flow indicator adapted for insertion in the milk flow line of dairy barn milking equipment, the indicator comprising:

(a) a body member formed of a durable material having a milk flow passageway extending therethrough and a housing formed into it;

(b) electrical means for sensing milk flow received in the body member adjacent to the passageway;

(c) electrically actuated indicating means for indicating a presence of milk flow in the milk flow passageway;

(d) an electrical circuit received in and sealed into the housing for operating the sensing means ad the indicating means to sense milk flow and indicate the status of the flow;

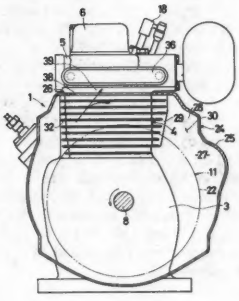
(e) a rechargeable battery received in the indicator and electrically connected to the electrical circuit but isolated from ground and external electrical connections so that the indicator is portable and self-contained and can be inserted independently in the milk flow line without electrical connection and still indicate condition of milk flow; and

(f) contacts mounted on the external surface of the indicator and electrically connected to the battery so that the battery can be recharged by external power without removal from the indicator.

4,873,944
PARTIALLY LIQUID-COOLED TYPE FORCED AIR-COOLING SYSTEM FOR INTERNAL COMBUSTION ENGINE

Kiichiro Yamada, Osaka, Japan, assignor to Kubota Ltd., Osaka, Japan

Filed May 2, 1988, Ser. No. 189,418
Claims priority, application Japan, May 2, 1987, 62-66913; May 2, 1987, 62-66914
Int. Cl.[4] P01P *9/04*
U.S. Cl. 123—41.57 17 Claims



1. A partially liquid-cooled air-cooling system for an internal combustion engine, comprising:

a rotatable shaft projecting forwardly from a front wall of a crankcase of said internal combustion engine, said shaft having a centrifugal cooling fan fixedly secured thereto in front of a crankcase, said cooling fan being encircled by a fan casing;

a back portion of a draft chamber formed within said fan casing, provided with a cooling air delivery opening adapted to direct cooling air about at least a cylinder of the engine;

a liquid-cooling jacket, formed to be in at least a portion of a cylinder head of the engine so as to be connected in communication to a radiator for cooling a flow of a cooling liquid therethrough; and

an upper wall portion of an encircling wall of said fan casing being provided with an air distribution opening arranged

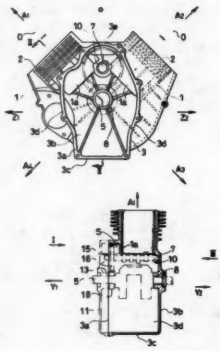
at a side of said cylinder head, said radiator being located adjacent to said distributing opening.

4,873,945

CYLINDER BLOCK CONSTRUCTION FOR V-TYPE ENGINES

Shinichi Tamba, and Hitomi Miyake, both of Hyogo, Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Continuation of Ser. No. 863,247, May 14, 1986, abandoned.
This application Apr. 14, 1988, Ser. No. 183,527
Claims priority, application Japan, May 17, 1985, 60-106376
Int. Cl.[4] F02B 75/22
U.S. Cl. 123—55 R 5 Claims



1. A one-piece die-cast crankcase and cylinder block casing structure for V-type two-cylinder internal combustion engines, comprising a combined crankcase and cylinder block casing open at one end wall side thereof, the structure being formed so that a bottom wall (3*c*) is declined in gradually widening cross-section in a vertical plane which includes the crankshaft central axis, toward the one end wall side (3*a*) in order to allow removal from a die-casting mold during projection of said structure, the cylinder block portion of the cast casing including right and left cylinder opposed to each other at 90° integrally mounted on a top side of the crankcase, a separate end cover mounted on the one-end wall side to close the crankcase, a first pair of bearings mounted in the separate end cover and an end wall of the crankcase opposite to the one end wall side for supporting the crankshaft, and a second pair of bearings mounted in the separate end cover and an opposite end wall for supporting a camshaft.

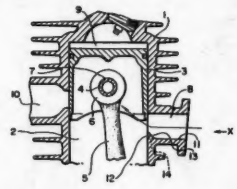
4,873,946

TWO-CYCLE INTERNAL COMBUSTION ENGINE

Isao Masuda, Tachikawa; Takashi Fukuoka, Fuchu, and Fujio Kobayashi, Hachioji, all of Japan, assignors to Kioritz Corporation, Tokyo, Japan

Filed Aug. 9, 1988, Ser. No. 230,141
Claims priority, application Japan, Aug. 25, 1987, 62-128863[U]
Int. Cl.[4] F02B 33/04
U.S. Cl. 123—65 PD 1 Claim

1. In a two-cycle internal combustion engine having a cylinder, a reciprocating piston provided in said cylinder, a connecting rod pivoted to said piston through the intermediary of a bearing portion, and an intake port formed in the side wall of the cylinder so as to be opened and closed by said piston and adapted to supply air-fuel mixture to a pre-compression chamber, the improvement comprises a protruding edge portion formed in a lower side surface of said intake port adjacent to said pre-compression chamber and adapted to deflect the air-fuel mixture introduced into said pre-compression chamber through said intake port toward said bearing portion which is provided between said piston and said connecting rod when the bearing portion is in the vicinity of top dead center, and a



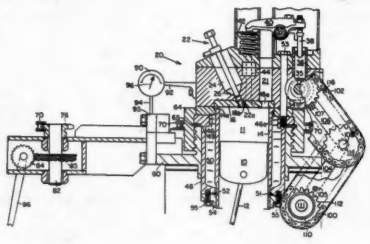
cut-in groove formed in said protruding edge portion substantially flush with said lower side surface for allowing any liquid remaining in said intake port to flow into said pre-compression chamber.

4,873,947

VARIABLE COMPRESSION RATIO DIRECT INJECTION ENGINE

Thomas W. Ryan, III; Milan J. Maymar, and Orin M. Anderson, all of San Antonio, Tex., assignors to Southwest Research Institute, San Antonio, Tex.

Filed Feb. 22, 1988, Ser. No. 158,317
Int. Cl.[4] F02B 75/04
U.S. Cl. 123—78 C 11 Claims



1. A compression ignition engine, said engine having a crankcase, crankshaft, a counterbalance case and flywheel, a connecting rod and piston assembly, a cylinder liner, and a cam shaft, comprising:

a holder for supporting said cylinder liner;

a head assembly connected to said holder, said head assembly including valve means;

means for alternately raising or lowering said cylinder liner relative to said crankshaft, thereby varying the compression ratio of said engine; and

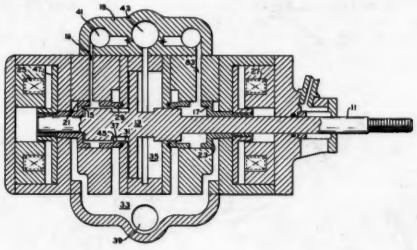
means for maintaining a substantially constant valve timing relationship as said cylinder liner is raised or lowered, said means for maintaining a substantially constant valve timing relationship comprising a timing shaft and a hinged linkage mechanism in operative engagement with said timing shaft and said cam shaft.

4,873,948

PNEUMATIC ACTUATOR WITH SOLENOID OPERATED CONTROL VALVES

Richeson, William E., and Frederick L. Erickson, both of Fort Wayne, Ind., assignors to Magnavox Government and Industrial Electronics Company, Fort Wayne, Ind.

Filed Jun. 20, 1988, Ser. No. 209,273
Int. Cl.[4] F01L *9/02, 9/04*
U.S. Cl. 123—90.11 **14 Claims**



10. A pneumatically powered valve actuator comprising a valve actuator housing; a piston reciprocable within the housing along an axis, the piston having a pair of oppositely facing primary working surfaces; a pressurized air source; a pair of air control valves reciprocable along said axis relative to both the housing and the piston between open and closed positions; means for selectively opening one of said air control valves to supply pressurized air from the air source to one of said primary working surfaces causing the piston to move; pneumatic means for decelerating the piston near the extremities of its reciprocation; and an intermediate pressure air source including differentially controllable valving means for supplying air from the intermediate pressure source to the pneumatic means to compensate for variations in external forces opposing piston motion.

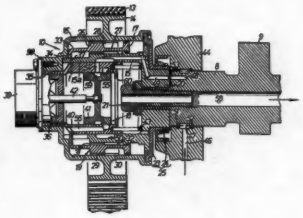
4,873,949

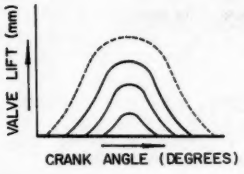
METHOD OF AND APPARATUS FOR CONTROLLING VALVE OPERATION IN AN INTERNAL COMBUSTION ENGINE

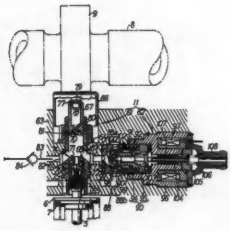
Yoshihiro Fujiyoshi, Kanagawa; Takatoshi Aoki, Tokyo, and Yasuhiro Urata, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 18, 1988, Ser. No. 273,882
Claims priority, application Japan, Nov. 19, 1987, 62-292617
Int. Cl.[4] F01L *9/02, 1/02*
U.S. Cl. 123—90.12 **13 Claims**

7. An apparatus for controlling valve operation in an internal combustion engine having a crankshaft for driving a camshaft with a cam for opening and closing an intake or exhaust valve which is spring-biased in a closing direction, said apparatus comprising, phase control means disposed between the crankshaft and the camshaft and lift control means disposed between the cam and the intake or exhaust valve, said phase control means including hydraulic means for changing the angular relationship between the camshaft and a timing wheel driven by the crankshaft for driving the camshaft, means for controlling said hydraulic means in response to engine operating conditions, said lift control means including hydraulic piston means for transmitting a valve-opening force from the cam to the valve, and hydraulic valve means for selectively releasing







the valve-opening force in response to engine operating conditions.

4,873,950

ENGINE START CONTROL APPARATUS

Masaaki Furuyama, Hoya, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 22, 1988, Ser. No. 234,685
Claims priority, application Japan, Aug. 28, 1987, 62-216128
Int. Cl.[4] F02D *45/00, 41/06*
U.S. Cl. 123—179 B **6 Claims**

1. An engine start control apparatus comprising:

at least one sensor for detecting an engine condition;

a backup memory for storing data obtained by using the content of a detection by said sensor;

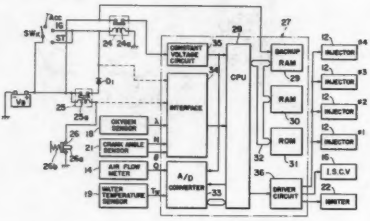
control means for controlling said engine in accordance with the stored data in said backup memory;

starting condition detector means for detecting a start ready state of said engine and outputting a start ready signal;

signal processing means for processing said content of a detection by said sensor and storing the processed result

into said backup memory when said start ready signal is received;

means for detecting a start operation of said engine; and



means for supplying a source voltage to said control means in response to an output signal from said start detection means.

4,873,951

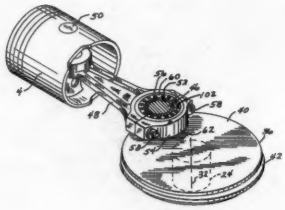
CONNECTING ROD WITH POLYMERIC COATED SIDEFACE

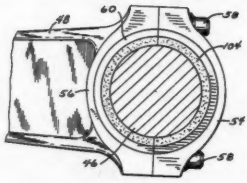
Steven C. Garthwaite, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Dec. 19, 1988, Ser. No. 286,514

Int. Cl.[4] F01M *1/00*

U.S. Cl. 123—196 W **15 Claims**





1. A two-cycle internal combustion engine comprising a piston reciprocal in a cylinder between a crankcase chamber and a combustion chamber, said engine having a crankshaft rotatably journaled therein along a crankshaft center-line, said crankshaft having a plurality of crankarms extending radially relative to said center-line, said crankarms having facing crankfaces, a crankpin extending axially between a pair of said crankarms perpendicularly from said crankfaces and parallel to and eccentrically offset from said crankshaft center-line, said piston having a connecting rod rotatably journaled on said crankpin, said connecting rod have sidefaces sliding along said crankfaces of said crankarms, said sidefaces of said connecting rod having a polymeric material coating thereon having a low coefficient of sliding friction and providing a bearing between said sidefaces of said connecting rod and said crankfaces of said crankarms to prevent galling and eliminate the need to silver plate said sidefaces of said connecting rod.

4,873,952

ENGINE CYLINDER HEAD WITH PRECOMBUSTION CHAMBERS USING POROUS CERAMICS INSERT

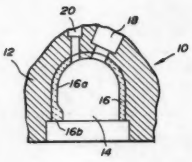
Yoshinori Narita, and Mitsuyoshi Kawamura, both of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Feb. 26, 1988, Ser. No. 161,013

Claims priority, application Japan, Mar. 2, 1987, 62-28799[U]

Int. Cl.[4] F02B *19/16*

U.S. Cl. 123—270 **16 Claims**



1. A cylinder head for an internal combustion engine, comprising:

a cast metal body having at least one recess which provides a precombustion chamber; and

a hollow member which is made of porous ceramics of which porosity is in the range from 5 to 50% and is cast-inserted in the inner wall surface of said cast metal body defining said recess such that the inner surface of the hollow member defines at least a major portion of the precombustion chamber, the cast-inserted hollow member being machine-finished and impregnated with an inorganic refractory material.

9. A method of producing a cylinder head for an internal combustion engine, comprising the steps of:

casting a mtal into a cylinder head body having at least one recess which provides a precombustion chamber with insert of a hollow member made of a porous ceramics of which porosity is in the range from 5 to 50% for each of said at least one recess such that the inner-surface of the cast-inserted hollow member defines at least a major portion of the precombustion chamber;

machine-finishing the cast-inserted hollow member;

impregnating the machine-finished hollow ceramics member with a treatment liquid comprising an inorganic refractory material; and

dissipating the liquid component of said treatment liquid from the hollow ceramics member to leave pores in the hollow ceramics member impregnated with said refractory material.

4,873,953

INDUCTION PORT ARRANGEMENT FOR INTERNAL COMBUSTION ENGINE HAVING MULTIPLE INLET VALVES PER COMBUSTION CHAMBER

Shigeo Muranaka, Yokosuka; Kouzaburou Ohkawa, Yokohama; Junichi Yokoyama, Zushi; Yutaka Matayoshi, Yokosuka, and Shigeru Kamegaya, Tokyo, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Continuation of Ser. No. 788,134, Oct. 16, 1985, abandoned. This application Oct. 17, 1988, Ser. No. 258,048

Claims priority, application Japan, Oct. 17, 1984, 59-217548; Jan. 24, 1985, 60-9851

Int. Cl.[4] F02M *35/10*

U.S. Cl. 123—308 **13 Claims**

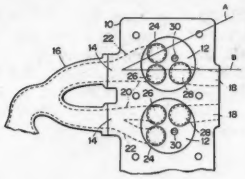
11. An internal combustion engine comprising:

a combustion chamber;

a spark plug;

a first inlet valve;

a second inlet valve;
an exhaust valve;
a bifurcate intake port having a main section adapted to communicate with an induction system and first and second branch passages which lead from said main section to said first and second inlet valves, respectively,
said first branch passage comprising:
(a) means for introducing an air-fuel mixture, which flows



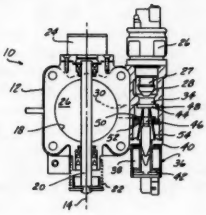
therethrough and which contains liquid fuel, into said combustion chamber in a manner to impart a swirl thereto and to cause said swirling mixture to intersect with and flow over said spark plug; and
(b) means for imparting a velocity to the liquid fuel of said air-fuel mixture sufficient to carry an amount of said liquid fuel along a path which is non-intersective with said spark plug which is sufficient to substantially obviate wetting of said spark plug.

4,873,954

FAIL-SAFE IDLE BYPASS SYSTEM

Daryl O. Codling, Rochester, Mich., assignor to Colt Industries Inc., New York, N.Y.

Filed Jul. 27, 1988, Ser. No. 224,719
Int. Cl.[4] F02D *41/22, 41/16*
U.S. Cl. 123—339 **14 Claims**



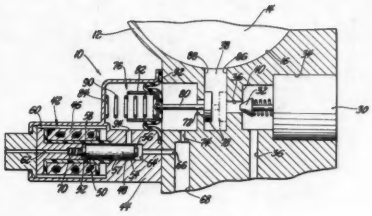
1. An idle bypass system for allowing a predetermined amount of fluid flow to an intake manifold of an engine, said system comprising
a throttle body having a longitudinal axis and forming a central passageway along said axis;
throttle plate means disposed within said central passageway traversely to said longitudinal axis for rotation between an open and closed position to allow fluid flow through said central passageway;
said throttle body including means forming a secondary passageway and having an inlet communicating with said central passageway upstream of said throttle plate means and an outlet communicating with the intake manifold downstream of said throttle plate means to allow fluid flow to bypass said throttle plate means when in said closed position;
motor means secured to said throttle body and cooperating with said secondary passageway for allowing a predetermined amount of fluid flow through said outlet; and
solenoid-actuated valve means secured to said throttle body and cooperating with said secondary passageway for blocking fluid flow to said motor means and allowing a predetermined amount of fluid flow to the intake manifold when the amount of fluid flow past said motor means is not within predetermined limits.

4,873,955

IDLE AIR FLOW SHUTOFF VALVE

Lawrence McAuliffe, Jr., Southfield, Mich., assignor to Colt Industries Inc., New York, N.Y.

Filed Sep. 19, 1988, Ser. No. 245,651
Int. Cl.[4] F02D *41/22, 41/16*
U.S. Cl. 123—339 **21 Claims**



1. An idle fluid flow shutoff assembly for allowing a predetermined amount of fluid flow to an intake manifold of an engine, said assembly comprising:
a throttle body having a longitudinal axis and forming a central passageway along the axis;
throttle plate means disposed within said central passageway traversely to the longitudinal axis for rotation between an open and closed position to allow fluid flow through said central passageway;
said throttle body including means forming a secondary passageway and having an inlet communicating with said central passageway upstream of said throttle plate means and an outlet communicating with the intake manifold downstream of said throttle plate means to allow fluid flow to bypass said throttle plate means when in said closed position;
motor means secured to said throttle body and cooperating with said secondary passageway for allowing a predetermined amount of fluid flow through said outlet;
pressure-actuated valve means moveable in response to the absence and presence of a predetermined pressure level and cooperating with said secondary passageway for allowing a predetermined amount of fluid flow to the intake manifold when the amount of fluid flow past said motor means is not within predetermined limits.

4,873,956

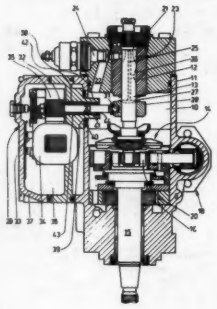
FUEL INJECTION PUMP FOR INTERNAL COMBUSTION ENGINES

Wolfgang Fehlmann, Stuttgart; Gerald Hofer, Bad Aibling; Dieter Junger, Stuttgart; Anton Karle, Leonberg, and Helmut Laufer, Gerlingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 17, 1987, Ser. No. 134,265
Claims priority, application Fed. Rep. of Germany, Feb. 13, 1987, 3704578
Int. Cl.[4] F02M *39/00*
U.S. Cl. 123—357 **2 Claims**

1. A fuel injection pump for internal combustion engines comprising a pump housing, a pump interior enclosed by said pump housing, said pump interior adapted to receive fuel under pressure, a pump piston that defines a pump work chamber for receiving fuel under pressure during an intake stroke of said pump piston, a final control element housing secured to said pump housing, a quantity adjusting device for controlling

the fuel injection quantity pumped at high pressure by said pump piston, an actuating part having a first end connected to said quantity adjusting device for adjusting said quantity adjusting device, said actuating part including a control shaft (30) of constant diameter supported in a slide bearing (41) supported in a wall of said final control element housing, said actuating part including a second end being actuatable by an electrical final control element being disposed in a final control



element chamber in said final control element housing, said final control element chamber communicating through at least one liquid-carrying opening with the pump interior and through a relief line (45) with a relief chamber (18), said at least one liquid-carrying opening embodied as a throttle gap (44) of constant cross section, and said throttle gap (44) of constant cross section embodied by a bearing gap of said slide bearing (41).

4,873,957

THROTTLE VALVE CONTROL APPARATUS

Yoshiji Ueyama, and Yoshiaki Asayama, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

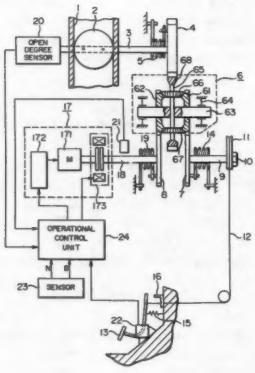
PCT No. PCT/JP88/00160, § 371 Date Sep. 27, 1988, § 102(e) Date Sep. 27, 1988, PCT Pub. No. WO88/06681, PCT Pub. Date Sep. 7, 1988

PCT Filed Feb. 17, 1988, Ser. No. 294,640

Claims priority, application Japan, Feb. 25, 1987, 62-41850

Int. Cl.[4] F02D *9/02*

U.S. Cl. 123—399 **3 Claims**



1. A throttle valve control apparatus comprising a valve shaft for opening and closing a throttle valve for changing the engine output, a differential gear unit for driving said valve shaft, a first and a second drive gear in mesh with said differential gear unit, and a first and a second drive means for independently driving said drive gears, characterized in that said valve shaft and said first and second drive gears are each provided with a return spring acting in a direction in which said throttle valve is closed.

4,873,958

ENGINE IGNITION TIMING CONTROL SYSTEM

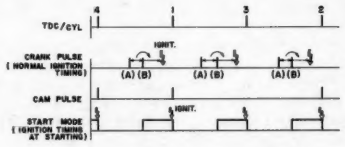
Kunihiro Abe, Higashimurayama, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 22, 1988, Ser. No. 234,687

Claims priority, application Japan, Aug. 28, 1987, 62-215978

Int. Cl.[4] F02P *5/15, 11/00*

U.S. Cl. 123—424 **4 Claims**



1. An engine ignition timing control system having a cam angle sensor for detecting specific cam angles and outputting corresponding cam angle signals, a crank angle sensor for detecting specific crank angles and outputting corresponding crank pulse signals, and a control unit for receiving as input signals from said sensors and controlling the engine ignition timing, said control unit comprising an engine starting detection means for detecting the starting of the engine, a crank pulse identifying means for receiving as input signals from said cam angle sensor and said crank angle sensor and identifying at least two crank pulses, a cyclic period calculation means for determining the cyclic period corresponding to the angular speed of the crankshaft in accordance with said at least two crank pulses thus identified by said crank pulse identifying means, and ignition timing calculation means for calculating ignition timing, whereby, when said engine starting detection means detects the engine starting, an ignition signal is outputted in response to a signal from said cam angle sensor, and, when said engine starting detection means detects completion of the engine starting, an ignition timing is determined and an ignition signal is outputted by said ignition timing calculation means in response to a signal from said crank angle sensor by way of said crank pulse identifying means and said cyclic period calculation means.

4,873,959

FUEL INJECTION PUMPING APPARATUS

David J. C. Law, London, and Lukhbir S. Panesar, Middlesex, both of England, assignors to Lucas Industries Public Limited Company, Birmingham, England

Filed Mar. 20, 1989, Ser. No. 325,540

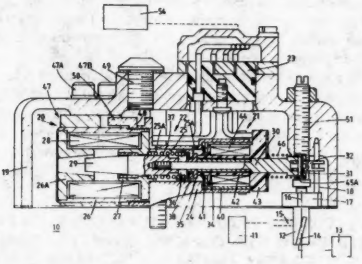
Claims priority, application United Kingdom, Mar. 25, 1988, 8807137

Int. Cl.[4] F02M *39/00*

U.S. Cl. 123—458 **11 Claims**

1. A fuel injection pumping apparatus for supplying fuel to an internal combustion engine comprising a body which houses a high pressure fuel pump, an angularly adjustable throttle member mounted in the body, for controlling fuel flow from a low pressure fuel pump to the high pressure fuel pump, the throttle member mounting an arm on the exterior of the body, a hollow housing adapted to be secured to the body, an electromagnetic actuator including an armature, an axially movable connecting rod connected at one end to the armature and its other end to said arm, a transducer including a core

member which is mounted about and movable with said connecting rod, a support for the actuator and the transducer and a clamp which adjustably clamps the support to the housing,



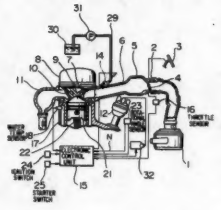
said clamp being releasable to enable for a given axial setting of the connecting rod, the quantity of fuel delivered by the apparatus to be adjusted to the desired value by moving the support relative to the housing.

4,873,960

ELECTRONICALLY-CONTROLLED FUEL INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINES

Hiroshi Kamifuji; Yoshiyuki Tanabe, and Kiyomi Morita, all of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 1, 1988, Ser. No. 214,484
Claims priority, application Japan, Jul. 3, 1987, 62-165197
Int. Cl.[4] F02D *41/30, 41/04;* F02M *51/00*
U.S. Cl. 123—480 **5 Claims**



1. An electronically-controlled fuel injection system for an internal combustion engine comprising:

means including a computer for electronically controlling a fuel injection quantity of an engine;

means for detecting a rotational speed of said engine;

a throttle sensor having lower and higher opening regions for detecting an opening of a throttle valve;

means for storing a ratio between slopes of output voltage characteristic curves respectively derived from said regions with respect to a throttle opening in a range where ranges of throttle openings to be detected in said regions overlap; and

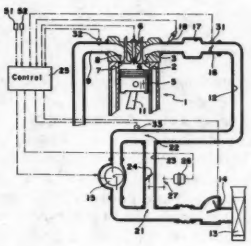
means for correctiong an output voltage generated from one of said regions in accordance with said ratio in a throttle opening range exceeding said overlapping range.

4,873,961

AIR-FUEL RATIO CONTROL FOR SUPERCHARGED AUTOMOBILE ENGINE

Hideki Tanaka, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 4, 1988, Ser. No. 177,343
Claims priority, application Japan, Apr. 2, 1987, 62-82004
Int. Cl.[4] F02D *23/02*
U.S. Cl. 123—564 **13 Claims**



1. An air/fuel control system of a supercharged automotive engine having a combustion chamber, introducing means for introducing air and fuel to said combustion chamber, and a supercharger for pressurizing charges of intake air introduced to said combustion chamber by the introducing means, said air/fuel control system comprising:

detecting means disposed in the engine for detecting a plurality of parameters representative of a condition under which the engine is operating and for issuing signals corresponding to said condition;

an air/fuel ratio regulating means operatively connected to the introducing means for regulating the ratio of air to fuel introduced by said introducing means to the combustion chamber;

supercharger operating means for rendering the operation of the supercharger effective and ineffective in the engine; and

control means operatively connected to said detecting means for receiving the signals issued by said detecting means and for evaluating the signals,

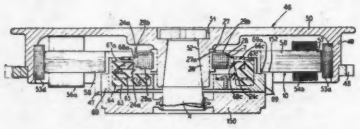
the control means operatively connected to said supercharger operating means for controlling said supercharger operating means to render the operation of the supercharger effective or ineffective based on the evaluation of the signals received, and

the control means also operatively connected to said air/fuel ratio regulating means for controlling said air/fuel ratio regulating means to regulate said ratio to a predetermined value higher than the stoichiometric value when the control means controls said supercharger operating means to render the operation of the supercharger effective and the control means evaluates the signals as representative of a steady operating condition of the engine in which a predetermined maximum amount of engine output is required, and to regulate said ratio to a predetermined value that is lower than the stoichiometric value when the control means evaluates the signals to be indicative of an engine operating condition in which an amount of engine output is required that is greater than said predetermined maximum amount.

4,873,962
HIGH EFFICIENCY ELECTRICAL ALTERNATOR SYSTEM

Edward J. Safranek, Arlington Heights, Ill., assignor to F & B Mfg. Co., Gurnee, Ill.

Filed May 9, 1988, Ser. No. 191,875
Int. Cl.[4] F02P 1/00
U.S. Cl. 123—599 5 Claims



1. An alternator employed in an engine having a drive shaft, comprising:

a flywheel connected to the drive shaft forming a rotor of the alternator, and said rotor having an interior cup-shaped portion receiving a plurality of ceramic magnets;

a stator constructed of silicon steel laminations positioned within the cup-shaped portion of the rotor and having at least one alternator coil on a stator pole positioned relative to the magnets on the rotor such that the magnets are directly adjacent and move past a pole face of the pole as the rotor rotates;

the rotor cup-shaped portion being circumferentially defined by an outer circular wall surrounding the stator and having said ceramic magnets mounted directly on an inside surface thereof facing the at least one stator pole face;

a ring-shaped starter motor ring gear surrounding the rotor and mounted on an outside surface of said outer circular wall;

the outer circular wall having a thickness at a location where the magnets are mounted of equal to or less than 0.3 inches;

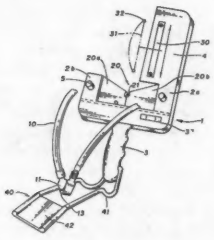
said thickness of the outer circular wall expressed as a percentage of radius of the rotor from a central axis thereof to said outer surface of the outer circular wall being equal to or less than 7%; and

said rotor being of one-piece construction and comprising a ductile iron casting.

4,873,963
ARROW SLING DEVICE, AND METHODS OF CONSTRUCTING AND UTILIZING SAME

Arie W. Lemmen, 401 Howard Ave., Lot 4, Holland, Mich. 49424

Filed Dec. 11, 1987, Ser. No. 131,566
Int. Cl.[4] F41B 3/00
U.S. Cl. 124—20 B 18 Claims



14. An arrow sling device, comprising:

a body portion including spaced legs extending upwardly at respective sides of said body portion;

a grip handle extending downwardly from said body portion;

resilient sling means for propelling an arrow, said sling means being connected with said body portion;

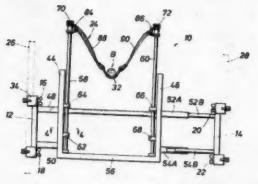
arrow guide means comprising a pair of gates supported on said spaced legs for guiding a shaft portion of an arrow loaded on said device; and

retainer means for normally holding said arrow guide means in a guiding position wherein said arrow is guided by said arrow guide means, and for permitting said arrow guide means to automatically move to an open release position when said arrow is propelled by said sling means.

4,873,964
APPARATUS FOR PLAYING GOLF FROM A GOLF CART

Vincent J. Bonoan, 7334 Oak Hill, Houston, Tex. 77087

Filed Oct. 14, 1988, Ser. No. 257,689
Int. Cl.[4] A63B 53/00; F41B 7/00
U.S. Cl. 124—20 R 19 Claims



1. Apparatus adapted for playing golf from a golf cart used for moving a player about a golf course and wherein a golf ball is projected from the golf cart, the apparatus comprising:

projecting means controlled by the player for moving the golf ball from the golf cart to the golf course while the player remains in the golf cart; and

laterally disposed attachment means spaced apart on opposite sides of said projecting means for attaching said projecting means to spaced apart members on the golf cart.

4,873,965
FLEXIBLE ENDOSCOPE

Guido Danieli, 28/A, Viale Filippetti, I-20122 Milano, Italy

Filed Jul. 15, 1988, Ser. No. 219,388
Claims priority, application Italy, Jul. 31, 1987, 21550 A/87
Int. Cl.[4] A61B 1/06
U.S. Cl. 128—6 17 Claims

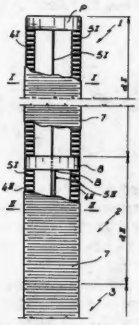
1. A flexible endoscope comprising a handle for an operator, control means on said handle to operate the endoscope, a flexible section, a first terminal articulated length composed of a plurality of articulated ring elements and controlled by said control means through the medium of motor means and two first pairs of wires passing through holes in said plurality of articulated ring elements, means on the tip of the terminal length for taking images in the cavity where the operation is taking place and for transmitting them to the outside, and means ancillary to the operation of said image-taking means, said ancillary means including

means for lighting said cavity, and

means for washing said cavity and said image-taking means,

wherein said endoscope also comprises, between said flexible section and said terminal articulated length, at least one additional articulated length controlled by a control means on said handle through motor means, and two second pairs of wires, each pair of said wires having the upper end fastened to a ring at the upper end of the addi-

tional articulated length and the lower end fastened to a motor means able to pull a wire and slacken the other wire, each motor means for each articulated length being in the form of an assembly comprising a pair of electric motors capable of rotation in both directions of revolution, each associated with means adapted to impart a linear movement, in one direction or in the other one, to the lower ends of a pair of wires, and each assembly of motor means being controlled by an assembly of means located on an outer face of the handle.



4,873,966

FOOTREST HAVING HEATING, VIBRATION AND MASSAGING ADJUSTED BY USER'S FEET

Michael Gitter, 4 Longfellow Place Apt. 1703, 80 Staniford St., Boston, Mass. 02114

Filed Dec. 21, 1987, Ser. No. 135,715
Int. Cl.[4] A61H *23/02, 15/00*
U.S. Cl. 128—33 **18 Claims**

1. A footrest comprising:

a panel having a top part with a footrest surface;

support means for movably mounting said panel to permit adjustable angular positioning of said top surface relative to horizontal;

vibrator means mounted inside said panel and responsive to application of voltage thereto for imparting vibration to said top surface;

selectively actuable vibration switch means mounted on said top part for selectively applying voltage to said vibrator means;

electrical heater means mounted inside said panel and responsive to passage of current therethrough for heating said top surface;

selectively actuable heater switch means mounted on said top part for selectively passing current through said heater means; and

massaging means for stimulating circulation in the soles of the feet of a user of said footrest, said massaging means comprising at least one roller member mounted on said panel for rotational movement about an axis extending substantially parallel to said top surface, said roller projecting at least partially above said top surface to permit selective rotation thereof by said user moving a foot along said top surface past said roller;

wherein said panel has: a length dimension corresponding to the heel-to-toe direction along which the feet of a user extend when using the footrest; a width dimension extending transversely of said length dimension; and a thickness dimension perpendicular to and very much smaller than both said length and width dimensions; said panel having first and second transversely spaced mounting slots defined entirely through said thickness dimension and extending lengthwise along most of said length dimension; and wherein said support means comprises:

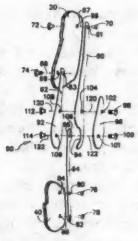
a frame having a base portion adapted to rest on a floor surface and two upstanding transversely-spaced supports having the same transverse spacing as said slots in said panel, each support including first and second upwardly converging edges having a lengthwise spacing near said base that is greater than the length of said slots, and a lengthwise spacing near the support top that is smaller than the length of said slots, each support having a transverse dimension no greater than the width of said slots in order to permit a top portion of each support to fit through a respective slot, whereby said panel can be selectively tilted at different angles relative to horizontal by selectively positioning said slots relative to said first and second edges of said supports.

4,873,967

KNEE ORTHOSIS

Jeffrey L. Sutherland, 39 Ximeno Ave., Long Beach, Calif. 90803

Filed Apr. 27, 1987, Ser. No. 42,807
Int. Cl.[4] A61F *5/00*
U.S. Cl. 128—80 C **37 Claims**



28. A knee orthosis for providing forces to restrain and restrict the movement of a leg during flexion and extension about the knee, comprising:

an upper orthotic assembly including a hard resilient upper shell adapted to substantially conform to the shape of the adjacent portion of the leg, also including means for affixing said assembly to the leg;

a lower orthotic assembly including a hard resilient lower shell with a softer inner lining adapted to substantially conform to the shape of the adjacent portion of the leg, also including means for affixing the assembly to the leg; and,

two orthosis linkages, one of the medial side of the knee, the other on the lateral side of the knee, each having a central portion and at least three members having an end proximate to the central portion and an end remote from the central portion, including:

a lower member connected to the lower shell, and rotatably connected to the central portion at a single axis pivot,

a short upper member pivotally connected to the upper shell at its remote end, and

a long upper member pivotally connected to the upper shell at its remote end, and pivotally connected to the proximate end of the short upper member at its proximate end, said pivotal connection being affixed to the central portion at an upper pivot point, said long upper member having a portion extending from the upper pivot point, said extended portion having a slidable contact surface on its posterior edge and said lower member having a fulcrum surface on its anterior edge proximate to the central portion, so that the contact surface and the fulcrum surface slidably engage begin-

ning at a first position within the range of 15° to 45° of full extension, and continually slidably engage between said first position and a second position of full extension.

4,873,968

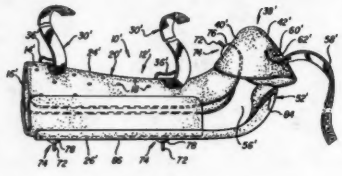
ADJUSTABLE HAND SPLINT

Alan Finnieston, Hialeah; Burkhalter, William E.; Reyes, Franklin, both of Miami, and Loren L. Latta, Plantation, all of Fla., assignors to Maramed Precision Corporation, Hialeah, Fla.

Continuation-in-part of Ser. No. 934,856, Nov. 25, 1986, Pat. No. 4,765,319. This application Aug. 22, 1988, Ser. No. 234,648

Int. Cl.[4] A61F 5/04

U.S. Cl. 128—87 R 11 Claims



1. A hand splint for immobilizing a hand, wrist, and distal forearm of a user, comprising:

a sleeve in which the hand, wrist and distal forearm are received, said sleeve being made of a semi-rigid material and including

(a) an elongate shell adapted to extend over the wrist and distal forearm, said shell including a volar shell portion and a dorsal shell portion which is partially received in said volar shell portion;

(b) a dorsal hood extending from said dorsal shell portion, said dorsal hood including a metacarpal hood portion which is adapted to cover the dorsum of the hand and a phalanx hood portion which is adapted to cover the proximal phalanges and which terminates thereat; said metacarpal hood portion adapted to form a dorsiflexion angle of between 60° to 80° with the axis of the forearm so that a comfortable maximal dorsiflexion of the wrist is achieved; and said metacarpal hood portion forming a hood angle of between 75° to 90° with said phalanx hood portion;

(c) a first attaching and locking means for adjustably attaching said dorsal hood to said dorsal shell portion while said hand splint is being fitted to the user and for subsequently locking said dorsal hood in the adjusted position to said dorsal shell portion after fitting;

(d) a palm arch support extending from said volar shell portion, said palm arch support extending adjacent said metacarpal hood portion in order to maintain the hand in said dorsal hood with the wrist in dorsiflexion by abutment with said metacarpal hood portion and the metacarpal-phalangeal joints at an angle of greater than about 90° to 105° by abutment of the proximal phalanges with said phalanx hood portion;

(e) a second attaching and locking means for adjustably attaching said palm arch support to said volar shell portion while said hand splint is being fitted to the user and for subsequently locking said palm arch support in the adjusted position to said volar shell portion after fitting; and

(f) a thumb opening between said dorsal hood and said palm arch support defined by borders thereof, said borders being adapted to be recessed from the thumb such that the thumb of the user extends through the thumb opening and all joints of the thumb are free to move; and

a holding means for holding said sleeve in radial abutment with the hand, wrist and distal forearm of the user.

4,873,969

METHOD AND APPARATUS FOR REMOVAL OF BONE CEMENT

Donald L. Huebsch, 3716 Prestwick Dr., Los Angeles, Calif. 90027

Continuation-in-part of Ser. No. 131,830, Dec. 11, 1987. This application Aug. 15, 1988, Ser. No. 232,506

Int. Cl.[4] A61F 5/04

U.S. Cl. 128—92 R 10 Claims

1. A process for removing bone cement from a bone cavity during a prosthetic revision, comprising:

providing a surgical instrument having a heated tip at its working end and a heat element carried by the instrument for heating the tip;

heating the tip by the heat element to a temperature sufficient to mold one or more grooves into the bone cement upon direct contact by the heated tip of the surgical intrument; insert the heated tip into the bone cement to mold one or more grooves into it,

removing the heated tip and, allowing the bone cement to reharden which produces weakened areas in the bone cement in the vicinity of the molded grooves, placing a surgical impact type chisel against the sections of the bone cement between said weakened areas, and removing the sections of bone cement by direct impacting of the chisel; and

repeating the molding and impacting steps until substantially all bone cement is removed from the cavity.

4,873,970

WARNING DEVICE TO INDICATE THE STATE OF GASES EXHAUSTION OF A GAS FILTER RETAINING DANGEROUS GASES

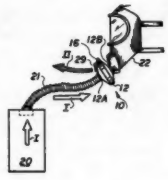
Michael Freidank; Jurgen Coym, and Axel Schubert, all of Berlin, Fed. Rep. of Germany, assignors to Auergesellschaft GmbH, Berlin, Fed. Rep. of Germany

Continuation of Ser. No. 41,595, Apr. 22, 1987, abandoned. This application Mar. 10, 1989, Ser. No. 323,069

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1986, 3613512

Int. Cl.[4] A62B 7/10

U.S. Cl. 128—202.22 12 Claims



1. A warning device for indicating the exhaustion of a separate gas filter retaining a toxic gas which device functions independently from the gas filter and comprises:

a housing having an inlet and an outlet through which gas is able to enter and leave the housing;

electrochemical means for directly detecting the overall concentration of the toxic gas that enters the housing from the gas filter, said electrochemical means disposed within the housing;

means for alerting disposed on the housing; and

means for activating the alerting means when a predeter-

mined concentration of toxic gas is detected, said activation means disposed within said housing.

4,873,971

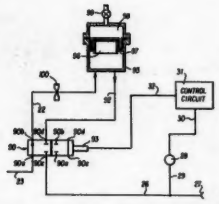
METHOD AND MEANS FOR DISPENSING RESPIRATING GASES BY EFFECTING A KNOWN DISPLACEMENT

Warren E. Perkins, 9960 S A-1-A, Apt. 1901, Jensen Beach, Fla. 34957

Continuation-in-part of Ser. No. 783,121, Oct. 2, 1985, Pat. No. 4,705,034. This application Oct. 26, 1987, Ser. No. 112,117

Int. Cl.[4] A61M *16/00*

U.S. Cl. 128—201.23 **9 Claims**



1. A device for supplying premeasured doses of respirating gas to a patient in synchronization with the respiratory cycle of the patient, comprising:

a source of respirating gas at relatively high pressure;

containment means having a volume sized to measure a prescribed single dose quantity of said respirating gas at source pressure and to temporarily store said measured dose;

means for sensing the onset of inhalations of the patient and for producing signals in response to said sensing;

first gas flow routing means for connecting said gas source to said containment means;

second gas flow routing means and cannula means, said second gas flow routing means connecting said containment means to one end of said cannula means;

means connected to the other end of said cannula means and adapted for communication with the nasal cavity of the patient;

valve means positioned in both said first and second gas flow routing means, said valve means arranged to alternate between two positions, the first of said positions connecting said source of respirating gas to said containment means through said first gas flow routing means thereby filling said containment means with respirating gas at source pressure, said valve means arranged to move to the second of said positions in response to a sensed inhalation signal, said second valve position connecting said containment means to said cannula means through said second gas flow routing means thereby releasing said measured dose quantity of respirating gas from said containment means and conveying said gas dose to the patient, said valve means arranged to return to the first of said positions after delivery of said measured gas dose to the patient has been completed.

4,873,972

DISPOSABLE FILTER RESPIRATOR WITH INNER MOLDED FACE FLANGE

Mark Magidson, Los Angeles, and Otto L. Huber, Beverly Hills, both of Calif., assignors to Moldex/Metric Products, Inc., Culver City, Calif.

Filed Feb. 4, 1988, Ser. No. 152,365

Int. Cl.[4] A62B *7/00*

U.S. Cl. 128—206.12 **27 Claims**

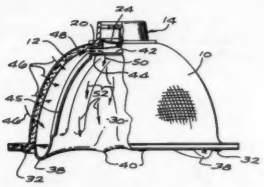
1. A filter respirator forming a face mask to be worn upon the face of a user for providing filtering of impurities in the air, including,

a support layer of flexible material including outer peripheral edges generally conforming to the contours of the face of the user and forming a flexible support layer of filter material and constructed to allow air inhaled by the user to flow through the support layer,

a separate layer of filter material supported by the support layer of flexible material and having properties of filtering impurities in the air inhaled by the user,

an exhalation valve extending through the support layer and the filter layer in a central position for exhausting air exhaled by the user and including an inside surface within the central position, and

a non-porous flexible inner flange forming a flexible half-mask conforming to the contours of the face of the user,



means providing for the passage of the inhaled air through the support layer and the layer of filter material and the deflection of such inhaled air by the inner flange, said means comprising said inner flange being sealingly attached to the outer peripheral edges of at least the support layer, the inner flange extending inwardly to the central position to direct the inhaled air, after deflection, to the central position and including a central opening with a surrounding portion conforming and contiguous to the inside surface of the exhalation valve, the surrounding portion of the inner flange being movable away from the inside surface of the exhalation valve, upon the inhalation of air by the user, and thereby forming an inhalation passage between the inside surface of the exhalation valve and the surrounding portion of the central opening of the inner flange to permit the passage of inhaled air to the user.

4,873,973

MULTI-PART NEUTRAL ELECTRODE FOR AN HF SURGICAL INSTRUMENT

Uwe Hagen, Forchheim, and Udo Redler, Effeltrich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, both of, Fed. Rep. of Germany

Filed Apr. 21, 1988, Ser. No. 184,460

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1987, 3723128; Sep. 3, 1987, 3729516

Int. Cl.[4] A61B *17/39*

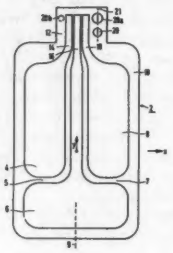
U.S. Cl. 128—303.13 **20 Claims**

1. A multi-part neutral electrode for an HF surgical instrument having partial electrodes arranged on a common carrier, in combination with a connecting clamp including two facing elements having respective inner surfaces urged together by spring force, one of said elements including electrical contacts therein and said two elements releasably clamping said neutral electrode for making electrical connection thereto, wherein:

an edge portion of said carrier is provided with an extension, said carrier extension having parallel electrical connections thereon leading from said partial electrodes;

said carrier extension including first and second openings arranged asymmetrically with respect to said parallel electrical connections and offset from the center of said carrier extension; and

one of the two facing elements of said connecting clamp is provided on its inner surface with first and second projec-



tions located for alignment with said first and second openings of said carrier extension.

4,873,974

NEUTRAL ELECTRODE FOR A HIGH-FREQUENCY SURGICAL INSTRUMENT

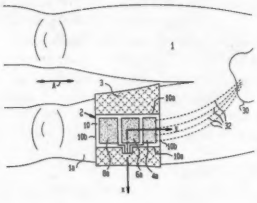
Uwe Hagen, Forchheim, and Udo Redler, Effeltrich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 21, 1988, Ser. No. 184,461

Claims priority, application Fed. Rep. of Germany, Sep. 11, 1987, 3730604

Int. Cl.[4] A61B *17/39*

U.S. Cl. 128—303.13 **4 Claims**



1. A neutral electrode assembly for a high-frequency surgical instrument, comprising:

an electrode carrier; and

at least three partial electrodes arranged in a predetermined direction next to each other on said electrode carrier so that the partial electrodes have surface areas which are decreasingly smaller in the predetermined direction, and the electrode carrier has on one side which is essentially parallel to the predetermined direction an electrical line terminal to which electrical connection lines lead from the partial electrodes.

4,873,975

ANASTOMOSIS DEVICE AND METHOD

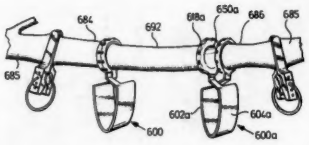
David J. Walsh, Mississauga; William M. Lougheed, Toronto; Fred Gentili, and Mahmood Fazl, both of Toronto, all of Canada, assignors to Walsh Manufacturing (Mississauga) Limited, Ontario, Canada

Continuation of Ser. No. 923,209, Oct. 27, 1986, Pat. No. 4,771,775, which is a division of Ser. No. 598,900, Apr. 10, 1984, Pat. No. 4,657,019. This application Dec. 14, 1987, Ser. No. 132,599

The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.

Int. Cl.[4] A61B *17/04, 17/08*

U.S. Cl. 128—334 R **5 Claims**



1. A unitary anastomosis device for non-suture end-to-end connection of tubular tissue members to be anastomosed comprising:

a first support member having a permanently formed first orifice wall defining a first orifice in said first support member for axial passage of a free open end of a first tubular tissue member therethrough,

a second support member having a permanently formed second orifice wall defining a second orifice in said second support member for axial passage of a free open end of a second tubular tissue member therethrough,

said first support member having means integral therewith and outwardly of said first orifice wall to secure the everted free open end of said first tubular tissue member thereto,

said second support member having means integral therewith and outwardly of said second orifice wall to secure the everted free open end of said second tubular tissue member thereto, and

a spring loaded body member integral with said first and second support members adapted to hold said first and second support members in a first position in which the support members are in a substantially contacting relationship with said first and second orifices in axial alignment, and a second position in which said first and second support members are in spaced apart relationship with said first and second orifices in axial alignment,

said support members being substantially annular and said first and second orifices being circular, said first and second orifice walls being circular, said means integral with said first and second support members comprising a plurality of outwardly extending spaced apart teeth,

the teeth on said first support member being adapted to engage an end of said first tubular member passed through said first orifice and everted thereover,

the teeth on said second support member being adapted to engage an end of said second tubular member passed through said second orifice and everted thereover,

whereby in said first position an annulus of tissue material at said everted end of said first tubular member is held against anastomatic separation in engagement with an annulus of tissue material at said everted end of said second tubular member,

said spring loaded body member urging said support members into said first position,

said first and second support members being separable to said second position responsive to pressure on said body member countering the spring loading,

said body member having a generally U-shaped portion having opposed first and second let members, said leg members terminating at their opposed free ends in first and second arms, said arms being in cross-over relationship, said arms terminating in said first and second support members.

4,873,976

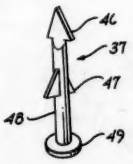
SURGICAL FASTENERS AND METHOD

Saul N. Schreiber, 6525 N. Central Ave., Phoenix, Ariz. 85012

Filed Feb. 28, 1984, Ser. No. 584,464

Int. Cl.[4] A61B *17/04*

U.S. Cl. 128—334 R **31 Claims**



16. A single unit suture for body tissue repair comprising:

a solid base member having a substantially flat portion for seating against an exterior surface of said tissue;

a single, rigid cylindrical shaft portion upstanding from and integrally connected to said base member and having a pointed end for insertion into said tissue; and

barb means positioned along said shaft portion.

4,873,977

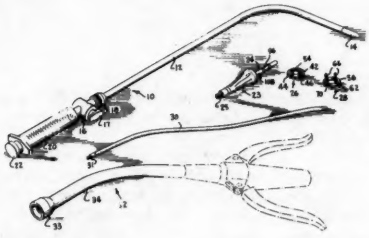
STAPLING METHOD AND APPARATUS FOR VESICLE-URETHRAL RE-ANASTOMOSIS FOLLOWING RETROPUBIC PROSTATECTOMY AND OTHER TUBULAR ANASTOMOSIS

Odis L. Avant, 4703 89th St., Lubbock, Tex. 79423, and Duane A. Crawford, Lubbock, Tex., assignors to Odis L. Avant, Lubbock, Tex.

Filed Feb. 11, 1987, Ser. No. 13,855

Int. Cl.[4] A61B *17/04*; B31B *1/00*; A61M *3/00, 29/00*

U.S. Cl. 128—334 R **74 Claims**



1. A surgical apparatus for effecting the connection of first and second hollow body members comprising:

(a) first and second connector components;

(b) a first operator comprising an elongated hollow tube having a distal end and dimensioned to be inserted in and through said first body member to position said distal end generally adjacent a part of said first body member to be joined to said second body member and including selectively operable first connection permitting means provided in said distal end;

(c) anvil means dimensioned to be positionable in said first body ember and including second connection permitting means operable for engagement with said first connection permitting means for connecting said anvil means to said distal end of said elongated hollow tube and further including first alignment means spaced from said second connection permitting means and a first connector component supporting means for supporting said first connector component;

(d) a second operator including a tubular housing having a distal end and being dimensioned to be positionable in said second body member with its distal end adjacent a portion of said second body member to be joined to said first body member, a second connector component supporting means in said distal end for supporting said second connector component, and second alignment means engageable with said first alignment means of said anvil means for effecting proper alignment of said first and second connector components in a ready condition and force exerting movable means mounted for movement in said tubular housing toward said anvil means when said first and second alignment means are in said ready condition, for forcefully moving said second connector component toward said first connector component to effect locking engagement of said first and second connector components; and

(e) wherein said first and second connector components include mutually facing clamping surfaces for clamping generally annular tissue portions of said first and second body members together when said second alignment means is engaged with said first alignment means and wherein said clamping surfaces include mutually engaging interlocking means which hold said annular tissue portions in clamped engagement with each other following locking engagement of said first and second connector components.

4,873,978

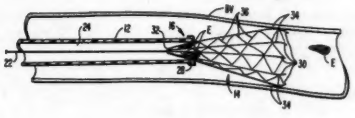
DEVICE AND METHOD FOR EMBOLI RETRIEVAL

Robert Ginsburg, 2489 Alpine Rd., Menlo Park, Calif. 94025

Filed Dec. 4, 1987, Ser. No. 128,770

Int. Cl.[4] A61M *29/00*

U.S. Cl. 128—345 **13 Claims**



1. A catheter device for capturing and retrieving emboli from a blood vessel, said catheter device comprising:

an elongate catheter body having a proximate end and a distal end;

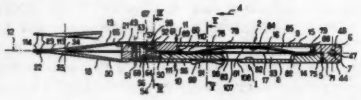
a strainer mounted at the distal end of the catheter body, said strainer comprising a plurality of tines which are shiftable between an opened configuration where they are capable of capturing emboli and a closed configuration where they are capable of retaining captured emboli, said tines having inwardly curved tips; and

means actuable from the proximate end for selectively shifting the tines of the strainer between the opened configuration and the closed configuration.

4,873,979
MICRO-SURGICAL INSTRUMENT FOR USE AS GRIPPER OF SCISSORS

Khalil Hanna, 19 rue Las Cases, 75007 Paris, France

PCT No. PCT/FR87/00078, § 371 Date Nov. 17, 1987, § 102(e) Date Nov. 17, 1987, PCT Pub. No. WO87/05484, PCT Pub. Date Sep. 24, 1987
PCT Filed Mar. 18, 1987, Ser. No. 128,074
Claims priority, application France, Mar. 18, 1986, 86 03828
Int. Cl.[4] A61B *17/30*
U.S. Cl. 128—354 33 Claims



1. A microsurgical instrument for use as pincers or scissors, said microsurgical instrument comprising:

two rigid longitudinal arms mutually pivoted about a defined transverse axis and have on one hand respective proximal ends and on the other hand respective distal ends, said distal ends being longitudinally spaced with respect to said axis and adapted to co-operate in a pinching or cutting action, respectively, by relative rotation of the two arms about said axis in a first direction corresponding to a mutual approach of said distal ends, the arms having respective manual operation zones for relative rotation about said axis in said first direction whilst there is provided means for resilient urging of the arms into relative rotation about said axis in a second direction opposite to said first direction and corresponding to a mutual spacing of said distal ends,

said axis being situated at the proximal ends of the arms, and said manual operation zones being situated between said axis and the distal ends of the arms,

both of the arms have in a fixed manner, at their proximal ends, at least one respective longitudinal lug arranged side to side, and said at least one respective longitudinal lug being pierced on said axis with respective bores in which is engaged a common pivot pin.

4,873,980
HEART PACEMAKER

Max Schaldach, Erlangen, Fed. Rep. of Germany, assignor to Mess-und Therapiegeräte GbmH & Co., Berlin, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 908,367, Sep. 17, 1986, abandoned. This application Mar. 17, 1987, Ser. No. 26,674
Claims priority, application Fed. Rep. of Germany, Sep. 17, 1985, 3533502
Int. Cl.[4] A61N *1/36*
U.S. Cl. 128—419 10 Claims

1. A cardiac pacemaker, comprising:

means for applying stimulating pulses to the heart of the patient at a rate determined by a pacing parameter;

means for detecting a first physiological parameter which is correlated with physical exertion of the patient and producing a first output signal representative of said first physiological parameter;

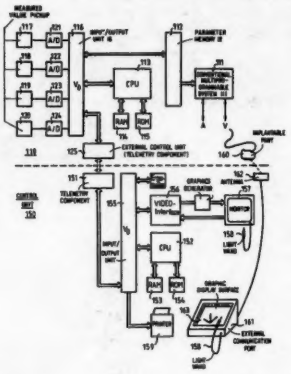
a memory having a plurality of memory locations containing data;

a means for producing a first address signal as a function of said first physiological parameter;

a means for producing at least one further address signal;

a means for addressing said plurality of memory locations as a function of said first address signal and said further address signal and for outputting the addressed data as a second output signal;

circuitry means receiving said first output signal for varying the pacing parameter as a function of said first output

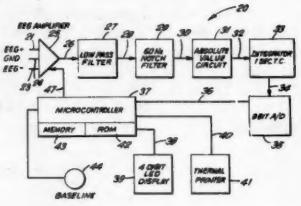


signal, said circuitry means being controllable by the addressed data received by said circuitry means.

4,873,981
ELECTROCONVULSIVE THERAPY APPARATUS AND METHOD FOR AUTOMATIC MONITORING OF PATIENT SEIZURES

Richard Abrams, Chicago, and Conrad M. Swartz, Lake Forest, both of Ill., assignors to Somatics, Inc., Lake Bluff, Ill.

Filed Oct. 14, 1988, Ser. No. 258,209
Int. Cl.[4] A61N *1/36*
U.S. Cl. 128—419 S 13 Claims



8. A system for electroconvulsive therapy ECT to monitor the termination of an induced seizure in a patient, the system including:

an ECT device including a plurality of electrodes removably securable on the head of the patient and means for applying electricity through the electrodes in an electroconvulsive therapy session to induce seizure, and

an electroencephalograph EEG means to detect electrical brain waves of the patient including means to amplify the brain waves and connected thereto, at least one electrode adapted to be removably secured to the head of the patient; system memory means to establish and store in system memory a baseline reference of a brain wave parameter, timer means to commence monitoring of brain waves for the termination of the seizure in the range of 1–30 seconds after ceasing the said application to induce seizure, measurement means for automatically measuring the termination of seizure as determined by the decline of the monitored brain wave parameter to the said baseline reference, display means to display said termination of seizure, an elapsed time means for measuring the time

from said commencement of monitoring until the brain wave parameter decreases to said baseline reference, and display means for displaying said elapsed time.

4,873,982

EXAMINATION GARMENT

Judith A. Morrison, 651 Fabyan Rd., Indianapolis, Ind. 46217

Filed Oct. 24, 1988, Ser. No. 261,331
Int. Cl.[4] A61B *5/00*
U.S. Cl. 128—630 **6 Claims**

1. A touch sensitive cancer detection garment to be worn during a tactile examination of the human body for lumps, in which the garment is worn over the area being examined, said garment comprising:

(a) first and second plies having contacting surfaces which glide easily over each other due to a low coefficient of friction so that an effective tactile examination may be conducted of an area of the body over which the garment is worn; and

(b) said first ply is located next to the skin when the garment is worn on the body and said second ply is sized slightly larger than said first ply such that when said second ply is secured to said first ply, said second ply fits loosely over said first ply to facilitate a greater range of sliding movement of said second ply relative to said first ply; and,

(c) means for securing said plies together to form said garment; and,

(d) said first ply is dominantly elastic in a first direction and said second ply is dominantly elastic in a second direction wherein, when said plies are joined together to form said garment, said first and second directions are substantially perpendicular to each other; and,

(e) means for securing the garment on an area of the human body.

4,873,983

STEERABLE GUIDEWIRE FOR VASCULAR SYSTEM

R. Edward Winters, Andover, Mass., assignor to Advanced Biomedical Devices, Inc., Andover, Mass.

Filed Jan. 27, 1988, Ser. No. 148,906
Int. Cl.[4] A61M *25/00*
U.S. Cl. 128—657 **5 Claims**

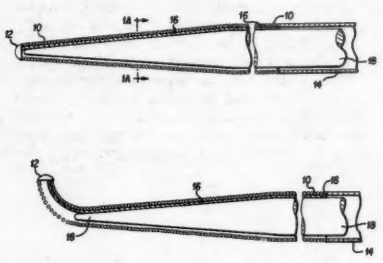
1. A steerable guidewire arranged to be transported through the vascular system comprising in combination:

a. a helically wound tapered spring terminating at the distal end in a smooth rounded tip;

b. a length of tubing attached to the proximal end of said spring;

c. a safety wire disposed within and attached to the inner surface of said spring, said wire extending to the tip of said spring, said wire having sufficient rigidity to allow said spring to be curved at its distal end; and

d. a tapered core wire moveably disposed within said tubing and said spring; the tip of said core wire arranged to be extended to the inner tip of said spring whereby the distal end of said spring will be variably stiffened and straightened according to the position of said core wire within said spring.

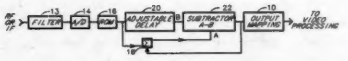


4,873,984

TECHNIQUES FOR CALCULATING ULTRASONIC INTEGRATED BACKSCATTER USING FREQUENCY OR TIME DOMAIN TECHNIQUES

Thomas J. Hunt, Derry, N.H.; James G. Miller, Clayton, Mo.; Lewis J. Thomas, III, Schenectady, N.Y.; Hewlett E. Melton, Jr., Andover, and Thomas A. Shoup, Lowell, both of Mass., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed May 30, 1986, Ser. No. 869,502
Int. Cl.[4] A61B *10/00*
U.S. Cl. 128—660.07 **7 Claims**



1. Apparatus for deriving signals indicative of the integrated ulrasonic backscatter of tissue lying along lines in a cross sectional area of a body comprising:

means for respectively launching pulses of ultrasonic pressure waves along a plurality of lines in a cross sectional area of a body in sequence,

transducer means for continually deriving first electrical signals from pressure waves scattered by tissues lying along each line,

circuit means responsive to said first electrical signals for continuously producing second electrical signals representing the instanteous ultrasonic power scattered by the tissue, and

circuit means for continuously integrating said second signals as they are produce so as to obtain third signals representing the ultrasonic energy scattered by a given volume of tissue that moves outward along said lines after a pulse is launched.

4,873,985

ULTRASONIC IMAGING APPARATUS UTILIZING DOPPLER FLOW METERING

Hirotaka Nakajima, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 4, 1988, Ser. No. 140,680
Claims priority, application Japan, Jan. 12, 1987, 62-3204
Int. Cl.[4] A61B *8/06*
U.S. Cl. 128—661.09 **9 Claims**

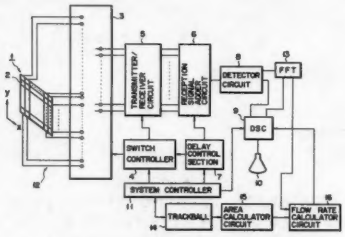
1. An ultrasonic imaging apparatus comprising:

ultrasonic transducer means, having a plurality of ultrasonic transducer elements arranged in a matrix having column and row lines, for emitting first and second ultrasonic

beams to an object having a blood vessel extending in a predetermined direction therein and for converting echoes of the ultrasonic beams into first and second echo signals;

driving means, coupled to said ultrasonic transducer means, for selectively driving said transducer elements for generating the first ultrasonic beam for scanning the object in a first B-scan orientation corresponding to the row lines, to obtain a first B-mode image, and the second ultrasonic beam for scanning the object in a second B-scan orientation corresponding to the column lines, to obtain a second B-mode image crossing the first B-mode image;

means for designating a selected scanning position in the



second B-scan orientation, the second B-mode image crossing the first B-mode image at the selected scanning position;

means for converting, into first and second image signals corresponding to the first and second B-mode images, respectively, the first and second echo signals output from said ultrasonic transducer means, said first and second echo signals corresponding to the echo signals obtained by scanning the object in the first and second B-scan orientations, said converting means including means for detecting a Doppler component from the first image signal; and

display means, coupled to said transducer means, responsive to the first and second image signals for displaying the first and second B-mode images.

4,873,986

DISPOSABLE APPARATUS FOR MONITORING INTRAUTERINE PRESSURE AND FETAL HEART RATE

William D. Wallace, Salt Lake City, Utah, assignor to Utah Medical Products, Salt Lake City, Utah

Continuation-in-part of Ser. No. 033,420, Apr. 1, 1987, Pat. No. 4,785,822. This application Apr. 27, 1988, Ser. No. 186,894

Int. Cl.[4] A61B *5/02*

U.S. Cl. 128—670 **44 Claims**

1. An apparatus for monitoring intrauterine pressure pulses and fetal heart rate, comprising:

a pressure transducer having a diaphragm with first and second sides, said first side being in communication with said intrauterine pressure pulses;

cable means for providing a plurality of electrical conductors, at least two of said plurality of conductors being connected to said pressure transducer;

vent means for introducing atmospheric pressure to said second side of said diaphragm;

means for connecting the plurality of electrical conductors to a monitoring device; and

a pair of electrode means for independently receiving electrical signals through amniotic fluid generated by the heart of a fetus, each said electrode means being located on an outside surface of said cable means so as to be in electrical contact with said amniotic fluid and being positioned at a leading end of said cable means adjacent said transducer such that when said leading end is inserted into the uterus of a patient, each said electrode means senses fetal heart rate through amniotic fluid within the uterus, each said electrode means being connected to at least one of the plurality of electrical conductors such that the fetal heart rate and the intrauterine pressure may be displayed by said monitoring device.

4,873,987

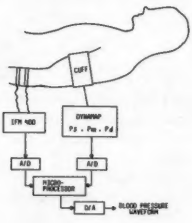
NONINVASIVE CONTINUOUS MONITOR OF ARTERIAL BLOOD PRESSURE WAVEFORM

Ljubomir Djordjevich, 4170 North Marine Dr., Apt. 18H, Chicago, Ill. 60613, and Anthony K. Ivankovich, 526 Woodland, Glenview, Ill. 60025

Filed Jun. 30, 1988, Ser. No. 213,358

Int. Cl.[4] A61B *5/02*

U.S. Cl. 128—672 **28 Claims**



1. A method of continuously, noninvasively measuring blood pressure, said method comprising the steps of:

noninvasively determining at least discrete systolic and diastolic blood pressure values;

simultaneously, noninvasively monitoring the patient with a waveform signal means to generate a sample continuous non-pressure waveform signal;

inputting said discrete systolic and diastolic blood pressure values and said sample continuous non-pressure waveform signal to a microprocessor;

calculating at least systolic and diastolic points for said sample continuous non-pressure waveform signal;

calibrating said systolic and diastolic points with said systolic and diastolic blood pressure values, respectively, and storing said calibrated information;

continuously, noninvasively monitoring said patient with said waveform signal means to generate a continuous non-pressure waveform signal;

using said calibrated information to transform said continuous non-pressure waveform signal into a continuous blood pressure waveform.

4,873,988

VASOMETRIC TEST APPARATUS FOR TESTING BLOOD SUPPLY TO THE TOE OF A PATIENT

Karl-Heinz Affeldt, and Ulrich Hantel, both of Berlin, Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed May 16, 1988, Ser. No. 194,463

Claims priority, application Fed. Rep. of Germany, May 21, 1987, 3717046

Int. Cl.[4] A61B *5/02*

U.S. Cl. 128—687 **17 Claims**

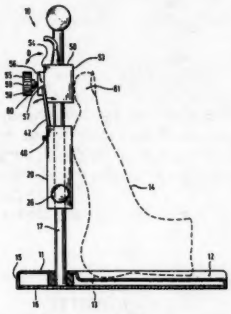
1. Vasometric test apparatus for testing blood supply to a toe (61) of the foot (14) of a patient, comprising

a base plate (11) formed with a depression to receive the heel (13) of the foot of the patient and thereby locate the foot of the patient with respect to a predetermined position on the base plate, whereby the foot is in upright vertical position;

an upstanding support structure (17, 18) projecting from the base plate (11) and extending vertically at an essentially right angle to the base plate;

a support element (20) adjustably positioned on the support structure (17, 18), said support element having a back wall (22) positioned for contacting the underside of the foot (14) of the patient in an essentially upright or vertical position, with the toe (61) projecting vertically;

a pulse sensor (50) having a sensing surface (53), supported



from said support element (20) for contact with the toe of the patient; and

means for placing said pulse sensor to align the sensing surface (53) thereof with the toe of the patient and in controlled resilient position with respect to the toe of the patient when the heel (13) of the patient's foot is in said depression and extending vertically, and the foot is resting against said back wall (22) of the support element,

said sensor placing means including means (26, 34, 40, 55, 60) for controllably resiliently supporting said pulse sensor (50) on said support element (20) for controlled resilient positioning with respect to the toe of the patient, and for controlled movement in three dimensions of the pulse sensor with respect to said base plate (11), whereby said pulse sensor can be aligned with the toe of the patient.

4,873,989

FLUID FLOW SENSING APPARATUS FOR IN VIVO AND INDUSTRIAL APPLICATIONS EMPLOYING NOVEL OPTICAL FIBER PRESSURE SENSORS

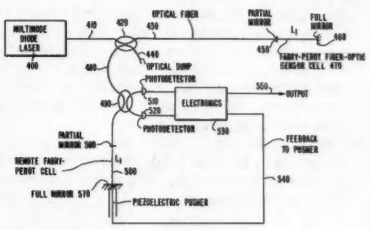
Robert E. Einzig, Herndon, Va., assignor to Optical Technologies, Inc., Herndon, Va.

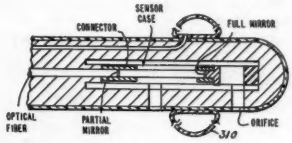
Continuation-in-part of Ser. No. 587,464, Mar. 8, 1984, abandoned, and a continuation-in-part of Ser. No. 776,118, Feb. 25, 1985. This application Oct. 3, 1986, Ser. No. 915,113

Int. Cl.[4] A61B *5/02*

U.S. Cl. 128—692 **16 Claims**

1. A fiber optic fluid differential pressure measuring device comprising a radiant energy emitting means having a predetermined coherence length an optical fiber sensor configured as an interferometer segment mounted on an optic fiber; said sensor interferometer segment causing path deviations of a measuring beam to be greater than the coherence length of the radiant energy emitted from said radiant energy emitting means; a pair of orifices adapted to be in communication with the fluid pressure to measured, said orifices positioned at each end of the optical fiber sensor segment; means for positioning said optical fiber sensor segment in the fluid to be measured; means for creating constriction in the fluid to be measured spaced between the pair of orifices; a fiber optical demodulator interferometer segment; said demodulator interferometer segment causing the path length of the said measuring beam to be within the coherence length of said radiant energy emitting means; means connecting the optical fiber sensor interferometer segment to the demodulator interferometer segment, said radiant energy emitting means directing radiant energy to the sensor interferometer segment through the optic fiber; and radiant energy detecting means connected to said demodulator interferometer segment.





4,873,990

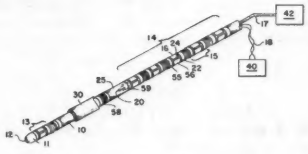
CIRCUMFERENTIAL PRESSURE PROBE

Harlan K. Holmes, Newport News; Thomas C. Moore, Jr., Poquoson, and Andrew J. Fantl, Richmond, all of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C. and Virginia Commonwealth University, Richmond, Va.

Filed Sep. 23, 1988, Ser. No. 248,020

Int. Cl.[4] A61B *5/00*

U.S. Cl. 128—748 **5 Claims**



1. A probe for measuring circumferential pressures inside a body cavity comprising:

a circularly sectioned, longitudinally extended support tube, said support tube having an internal lumen and an outside wall, said outside wall consisting of an elastic material, said material capable of being deformed by pressures in the range expected to exist in the area inside the body cavity which is under investigation and tending to return to its original configuration once the pressure is removed,

at least one deformable wall sensor along the length of the support tube, each such sensor comprising:

slot means extending through the outside wall of the support tube so that an essentially rectangular flexible

wall section is separated from the support tube on three sides, the fourth side of the flexible wall section remained attached longitudinally to the support tube; and

deformation measurement means such that when the flexible wall section is displaced inwardly by an externally applied pressure and deformed, a signal proportional to the degree of deformation is produced which is detectable by an external sensing means;

external connecting means for connecting the deformable wall sensor to an external sensing means, said external connecting means passing through the lumen of the support tube and terminating at a connection with the external sensing means; and

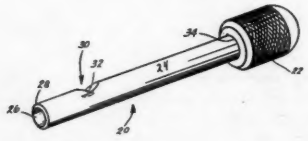
protecting means for protecting sensor components from substances in the area inside the body cavity which is under investigation so that said substances cannot penetrate the slot means.

4,873,991

BIOPSY NEEDLE

Bruce A. J. Skinner, 115 Upton Rd., Sauet Ste. Marie, Ontario, Canada (P6A 3W2)

Filed Sep. 21, 1988, Ser. No. 247,169
Int. Cl.[4] A61B *10/00*
U.S. Cl. 128—754 **14 Claims**



1. A biopsy needle for sampling tissue and the like, said biopsy needle comprising:

a sidewall of a rigid material defining a hollow interior portion;

a sharpened forward end associated with said sidewall for severing the tissue;

a lanced section disposed along said sidewall, said lanced section being formed from said rigid material of said sidewall itself and defining a rigid blade sloping and facing rearwardly away from said forward end and penetrating said hollow interior portion whereby upon inserting said needle into a subject, severing a tissue with said sharpened end, passing a tissue into said hollow interior and slicing off a tissue sample by rotating said blade 360 degrees, a tissue sample is securely held within said needle as said needle is withdrawn from a subject

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4,873,992

CERVICAL CYTOLOGY DEVICE

Irman D. Bayne, Littleton, Colo., assignor to Medical Dynamics, Inc., Englewood, Colo.

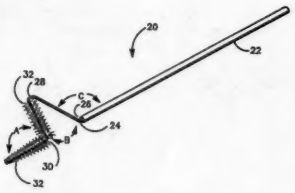
Division of Ser. No. 28,458, Mar. 20, 1987, Pat. No. 4,754,764. This application Feb. 8, 1988, Ser. No. 153,417
Int. Cl.[4] A61B *10/00*
U.S. Cl. 128—756 **9 Claims**

1. A cervical cytology device for simultaneously collecting cytology cell samples from the endocervix and exocervix, said device comprising:

a handle for manipulating and rotating said device and having a handle shaft bent to provide a proximally extending handle portion and a laterally extending offset portion;

an intermediate region, with a shaft surrounded by cell collecting means attached at one end to said laterally extending offset portion of said handle and having a surface sized and configured to scrape cytology cell samples from the exocervix when said device is rotated and said intermediate collecting means is in contact with the exocervix;

a distal region with a shaft surrounded by cell collecting means attached to said shaft of said intermediate cell collecting means, said collecting means having a surface sized and configured to scrape cytology cell samples from



the endocervix when the device is rotated and said distal collecting means is in contact with the endocervix;

said intermediate region shaft being integral with said distal region shaft but extending laterally from said distal region shaft

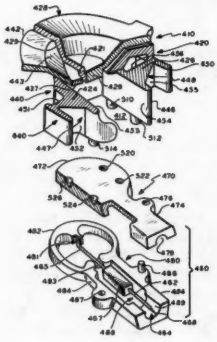
said handle portion being axially aligned with said shaft of said distal region.

4,873,993

CUVETTE

Peter M. Meserol, Montville, and Thomas Palmieri, Paramus, both of N.J., assignors to Personal Diagnostics, Inc., Whippany, N.J.

Continuation-in-part of Ser. No. 888,752, Jul. 22, 1986, abandoned. This application Jul. 13, 1987, Ser. No. 69,505
Int. Cl.[4] A61B *5/00*
U.S. Cl. 128—760 **5 Claims**



1. A combination lancet and cuvette apparatus, comprising:

cuvette providing a cavity for receiving an optically transparent medium including a reagent test system for reacting with a sample portion of a fluid of interest; said cuvette made of optically transparent material and provided with a shape and optical elements for causing a beam of light to pass therethrough and through said medium by total internal reflectance and for causing said beam of light to be reflected back along a line different from the direction of the line of entry of said light beam into said cuvette;

a lancet provided on and extending from said cuvette and including a rearward portion and a forward tip for producing skin puncture to produce said body fluid of interest;

said cuvette comprising a cuvette body member including a generally funnel-shaped upper portion including a bottom and an inwardly extending generally spherical surface providing a depression, and a closed wall portion formed integrally with said upper portion and extending downwardly therefrom, said closed wall including opposed wall portions provided with integrally formed opposed angular portions providing said optical elements with each optical element including flat outer and inner surfaces for being disposed perpendicular to said beam of light and an outer angular surface for being disposed at a predetermined angle with respect to one of said flat surfaces;

said lancet comprising a lancet support member including a resilient rearward portion and a forward portion, said rearward and forward portions of said lancet support member cooperatively providing an internal chamber for slidably receiving said lancet with said forward tip of said lancet extending outwardly out of said lancet support member through an opening formed in said forward portion of said lancet support member and with said rearward portion of said lancet secured to said resilient rearward portion of said lancet support member, upon sufficient force being applied externally to said resilient rearward portion of said lancet support member said resilient rearward portion being bowed inwardly to advance said lancet sufficiently forward to cause said forward tip of said lancet to produce said skin puncture and provide said body fluid of interest;

said closed wall including a bottom portion and said rearward portion of said lancet support member including a top portion, said bottom and top portions provided with mutually engageable connecting members for securing said lancet support member to the bottom portion of said closed wall and upon said top portion of said rearward portion of said lancet support member being secured to said bottom portion of said closed wall, said top portion of said rearward portion of said lancet support member, said closed wall and said bottom of said generally funnel-shaped upper portion providing in combination said cavity for receiving said medium including a reagent test system;

said bottom of said generally funnel-shaped upper portion provided with a centrally formed access opening extending therethrough and providing access to said cavity for said sample portion and said depression for facilitating wiping of said sample portion of said fluid of interest into and through said access opening and into said cavity; and

upon said beam of light perpendicularly striking said outer flat surface of one of said angular portions of said closed wall, said beam of light entering and passing into said one angular portion substantially without refractance and striking the interface between said outer angular surface of said one angular portion and the surrounding medium at an angle above the critical angle for total internal reflectance and being reflected internally therefrom through said one angular portion and exiting said flat inner surface of said one angular portion substantially without refractance, said beam of light continuing through said cavity, through said optically transparent medium and perpendicularly striking said flat outer surface of said other angular portion and passing into said other angular portion substantially without refraction and striking the interface between said outer angular surface of said other angular portion and the surrounding medium at an angle above the critical angle for total internal reflectance and being reflected internally therefrom through said other angular portion and perpendicularly exiting said outer flat surface of said other angular portion substantially without refractance.

4,873,994

DEVICE FOR DETERMINING THE FORCES IN THE AREA OF THE CONTACT SURFACES BETWEEN A SPECTACLE FRAME AND THE HEAD OF THE WEARER

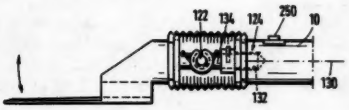
Wilhelm Anger, Moritz-Suvretta, and Christoph Leuzinger, Zufikon, both of Switzerland, assignors to Eyemetrics-Systems AG, Steinbockstrasse, Switzerland

Continuation of Ser. No. 898,715, Aug. 21, 1986, abandoned. This application Jan. 26, 1989, Ser. No. 303,055

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1986, 3610897

Int. Cl.[4] A61B 5/00

U.S. Cl. 128—774 15 Claims



1. A device for measuring contact forces between a spectacle frame and the head of a spectacle wearer comprising: a rigid holder; a sensor for measuring forces directed in a first direction, said sensor being comprised of a transducer and an elongated portion having a free end which supports relatively moveable parts insertable between said spectacle frame and the head of a wearer, said elongated portion being engageable with said transducer such that relative movement of said relatively moveable parts in said first direction causes said transducer to provide a signal which represents the contact force to be determined; and a flexible hinge having a pivot axis which extends substantially perpendicular to said first direction, said hinge having a portion on one side of said pivot axis connected to said sensor and a portion on the other side of said pivot axis connected to said rigid holder, said hinge being of sufficient flexibility relative to said rigid holder so as to prevent movement of said holder in said first direction from appreciably affecting measurement of said contact forces.

4,873,995

HEATING APPARATUS FOR HYPERTHERMIA

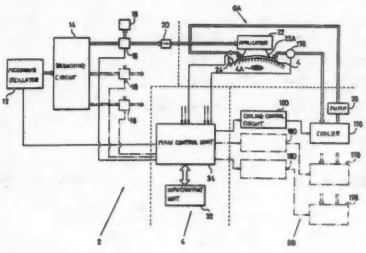
Makoto Kikuchi, Mitaka; Shinsaku Mori, Tokyo; Yoshio Nikawa, Tokyo, and Takashige Terakawa, Tokyo, all of Japan, assignors to Tokyo Keiki Co., Ltd., Tokyo, Japan

Division of Ser. No. 757,850, Jul. 22, 1985, Pat. No. 4,744,372. This application Nov. 16, 1987, Ser. No. 121,218

Claims priority, application Japan, Jul. 31, 1984, 59-162464; Jul. 31, 1984, 59-162465; Jul. 31, 1984, 59-162466; Jul. 31, 1984, 59-162467

Int. Cl.[4] A61N 5/02

U.S. Cl. 128—804 9 Claims



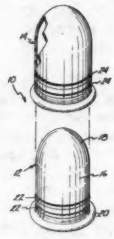
1. Hyperthermia apparatus comprising:

(a) at least one treatment branch including:

(1) a microwave source for generating microwaves that are applied to the branch;

(2) an application for applying microwaves in the branch to a treatment region of a patient;
(3) a cooling mechanism for cooling the surface of said treatment region when coolant is supplied to said cooling mechanism;
(4) a coolant reservoir;
(5) a pump operable to exchange coolant between said reservoir and said cooling mechanism; and
(6) a cooling control circuit connected to said reservoir for effecting step-wise changes in the temperature of the coolant in said reservoir in response to control signals;
(b) a main control unit comprising:
(1) means for periodically reducing the power level in said branch to zero;
(2) means made effective each time the power level in said branch is zero for measuring internal and surface temperatures of said treatment region; and
(3) means responsive to the internal and surface temperatures each time they are measured for generating a control signal that is applied to said cooling control circuit such that the latter controls the temperature of coolant in the reservior in accordance with the measured internal and surface temperatures.

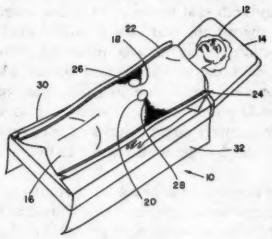
4,873,996
VAGINAL STIMULATOR FOR CONTROLLING URINARY INCONTINENCE IN WOMEN
Donald D. Maurer, Anoka, Minn., assignor to Empi, Inc., St. Paul, Minn.
Division of Ser. No. 916,118, Oct. 6, 1986, Pat. No. 4,785,828. This application Aug. 18, 1988, Ser. No. 233,232
Int. Cl.[4] A61F *13/00*
U.S. Cl. 128—844 **4 Claims**



1. A condom which can be removably unrolled onto a vaginal plug of the type having electrodes on an exterior surface of the plug, wherein the condom is collapsible, fabricated of stretchable, pliable and impermeable material, and includes at least one pair of spaced-apart conductive elements positioned so as to be in electrical contact with the electrodes when the condom is unrolled onto the plug.

4,873,997
SURGICAL DRAPE
Lyman R. Marshall, Asheville, N.C., assignor to Scherer Healthcare Ltd., Asheville, N.C.
Filed Apr. 25, 1988, Ser. No. 186,099
Int. Cl.[4] A61F *13/00*
U.S. Cl. 128—849 **2 Claims**

1. An improved surgical drape comprising: a first sheet for receiving fluid runoff from a site of surgical procedure; means for directing the fluid along a portion of said first sheet; said means for directing located on said first sheet; at least a second sheet connected to said first sheet; a third sheet; said first sheet being located between said second and third sheets; said means for directing includes first and second pleats; said second sheet



connected to said first pleat and said third sheet connected to said second pleat.

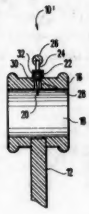
4,873,998
SURGICAL HAND PROTECTOR SYSTEM
Danny W. Joyner, Erwinna, Pa., assignor to Johnson & Johnson Patient Care, Inc., New Brunswick, N.J.
Filed Oct. 21, 1988, Ser. No. 260,630
Int. Cl.[4] A61F *13/00*
U.S. Cl. 128—879 **3 Claims**

1. A surgical hand protector system comprising:
a molded thermoplastic band for emplacement over the base of the hand, said band forming a continuous loop to rest between the thumb and index finger of the hand and around the palm and back of the hand, said band containing performations into which can be placed the fingers;
a molded projection connected to said band and formed from the same thermoplastic material as said band, said projection covering a portion of the thumb and containing a perforation through which can be placed the thumb;
said band and said projection having continuous open ends through which the hand is insertable, said band and said projection forming an open portion which exposes a part of the palm below the third and fourth fingers to allow greater dexterity during use of said system; and
a pliable surgical glove emplaced over the hand to cover the areas of the hand exposed by said band and said projection;
wherein the hand is completely covered yet retains dexterity and mobility when protected by said system.

4,873,999
CIGARETTE HOLDER
Rosa M. Steinert, 103 Glenmore Ave., Central Islip, N.Y. 11722
Filed Nov. 18, 1988, Ser. No. 272,798
Int. Cl.[4] A24F *13/08, 13/12*
U.S. Cl. 131—259 **3 Claims**

1. A cigarette holder, comprising:
an elongated cylindrical stem;

a flattened handle portion at one end of said stem;
a generally cylindrical holding element at an opposite end of said stem;
a cylindrical passage formed centrally through said holding element, a longitudinal axis of said passage extending generally perpendicular to said stem;
a transverse aperture extending through a cylindrical side wall of said holding element and intersecting said cylindrical passage, a longitudinal axis of said transverse aperture in alignment with said stem;
a cup-shaped retaining boss on an exterior portion of said holding element, surrounding said transverse aperture, said box having a reduced diameter aperture in alignment with said transverse aperture;



an elongated retaining pin having a sharpened tapered end portion inserted into said transverse aperture;
an enlarged head portion on an outer end of said retaining pin, exterior of said boss;
a radial flange on an intermediate portion of said retaining pin, said radial flange having a diameter slightly less than said transverse aperture and greater than said boss aperture;
and
a coil spring surrounding said retaining pin and having a first end in abutment with said radial flange and an opposite end in abutment with an interior top wall of said boss, said spring biasing said sharpened tapered end portion of said retaining pin toward said cylindrical passage.

4,874,000

METHOD AND APPARATUS FOR DRYING AND COOLING EXTRUDED TOBACCO-CONTAINING MATERIAL

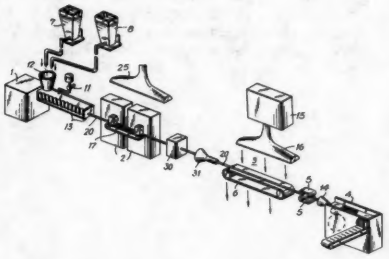
Ronald A. Tamol; Jose G. Nepomuceno; Gus D. Keritsis; George H. Burnett, all of Richmond; Richard A. Thesing, Glen Allen; Warren D. Winterson, Midlothian, and Walter A. Nichols, Richmond, all of Va., assignors to Philip Morris Incorporated, New York, N.Y.

Continuation-in-part of Ser. No. 900,715, Aug. 27, 1986, which is a continuation-in-part of Ser. No. 740,325, Jun. 3, 1985, Pat. No. 4,632,131, which is a continuation-in-part of Ser. No. 627,407, Jul. 3, 1984, abandoned, which is a continuation-in-part of Ser. No. 723,883, Apr. 16, 1985, Pat. No. 4,625,737, which is a continuation of Ser. No. 457,505, Dec. 30, 1982, Pat. No. 4,510,950. This application Jul. 17, 1987, Ser. No. 74,990

Int. Cl.[4] A24B *3/14*

U.S. Cl. 131—375 **43 Claims**

1. A method for processing continuously extruded tobacco-containing materials, comprising:
drying the extruded material by passing it from the die of the extruder to and through a microwave resonant cavity energized by microwave energy, and propagating microwave energy from a source into the resonant cavity, wherein the microwave frequency is responsive to the resonant frequency of the moisture or other solvent to convert them to a gaseous product; and
exposing the extruded material to said microwave energy to reduce the OV level of the extruded material to an OV level at about or below the equilibrium OV level for of the extruded material; and
cooling the extruded material so that the surface temperature of the extruded material is decreased below the bulk temperature to provide the extruded material with a structure adequately rigid and stable dimensionally for forming into smoking articles.



4,874,001

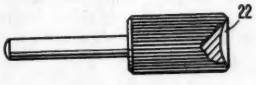
MANICURIST'S BIT

Lori Ferraris, Los Angeles, Calif., assignor to Koasepts Beauty Supply, Inc., Los Angeles, Calif.

Filed Nov. 2, 1987, Ser. No. 115,703

Int. Cl.[4] A45D *29/05*

U.S. Cl. 132—75.8 **7 Claims**



1. A bit for shaping artificial surfaces, comprising:
a substantially cylindrically-shaped body portion;
a plurality of knurls, each knurl having a leading edge and a trailing edge, said leading edge and trailing edge of each knurl protruding from said body portion, said leading edge and trailing edge being angled with respect to the normal line of the body portion at the point of protrusion and being substantially parallel, and each of said knurls having a planar surface area connecting said leading and trailing edges;
wherein one end of said body portion has a concave surface area.

4,874,002

APPARATUS FOR FLUSHING A PIPING SYSTEM

Göran Sundholm, Helsingforsvägen 23 A, SF-02700 Grankulla, Finland

PCT No. PCT/FI86/00078, § 371 Date Feb. 26, 1987, § 102(e) Date Feb. 26, 1987, PCT Pub. No. WO87/00455, PCT Pub. Date Jan. 29, 1987

PCT Filed Jul. 7, 1986, Ser. No. 34,557

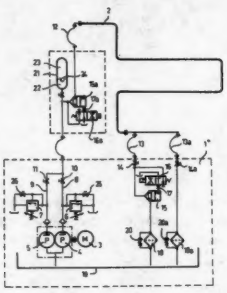
Claims priority, application Finland, Jul. 22, 1985, 852846; Jan. 24, 1986, 860340

Int. Cl.[4] B08B *9/06*

U.S. Cl. 134—111 **10 Claims**

1. An apparatus for flushing a piping system, comprising:
liquid pump means (4, 50) for providing pressure liquid at an operational pressure higher than that to overcome a pressure fall of a piping system (2, 51) at a turbulent flow;
at least one pressure liquid accumulator (21, 41, 55) connected to the liqud pump means for receiving the pressure

liquid therefrom, the pressure liquid accumulator comprising a liquid space having an inlet/discharge opening for receiving and discharging the pressure liquid into and out of the liquid space, a continuously closed gas space for a gas, and a flexible membrane between the liquid and closed gas spaces for compressing the gas in the closed gas space when the pressure liquid is received in the liquid space, whereby the pressure in the pressure liquid accumulator increases;



connection means for connecting the inlet/discharge opening to the piping system and providing the pressure liquid discharge out of the former to the latter;

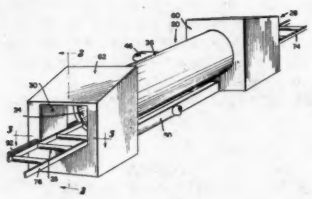
at least one blocking valve means (15, 15a, 44, 56) for inhibiting the provision of the pressure liquid discharge to the piping system by the connection means until a predetermined pressure is reached in the pressure liquid accumulator and then suddenly opening for suddenly permitting the provision of the same, whereby to produce a powerful flow pulse through the piping system.

4,874,003

FLITCH WASHER

George Weil, Mississauga, Canada, assignor to David R. Webb Co., Inc., Edinburgh, Ind.

Filed Dec. 16, 1983, Ser. No. 562,460
Int. Cl.[4] B08B *3/02*
U.S. Cl. 134—111 8 Claims



4. A flitch washer comprising a first inner cylinder defining a passageway open at an entry end and an exit end,

means for conveying a flitch through the passageway from the entry end to the exit end,

means comprising a plurality of openings through the first inner cylinder and a plurality of nozzles and plugs for engaging the openings, the nozzles and plugs engaging the openings in a selected pattern to provide a selected spray pattern for the washing fluid into the passageway, said selected spray pattern including a pattern portion directing the washing fluid longitudinally inwardly from nozzles adjacent the entry end and exit end of the passageway toward the center of the length of the passageway,

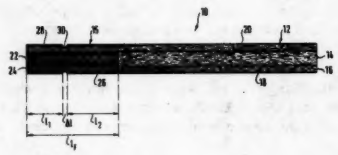
and means for supplying washing fluid to the nozzles, said washing fluid supply means comprising a second outer cylinder having an axis extending generally parallel to the axis of the inner cylinder and having ends adjacent the entry and exit ends of the passageway, means for closing the spaces between the ends of the outer cylinder and the inner cylinder to define a volume between them and means for providing washing fluid through the outer cylinder and into the volume to supply washing fluid to the nozzles.

4,874,004

COAXIAL CIGARETTE

Horst Borowski, Hamburg; Erwin Kausch, Jesteburg; Erhard Rittershaus; Gert Rudolph, both of Hamburg, and Werner Schneider, Quickborn, all of Fed. Rep. of Germany, assignors to B.A.T. Cigarettenfabriken GmbH, Hamburg, Fed. Rep. of Germany

Filed Dec. 9, 1988, Ser. No. 281,640
Claims priority, application Fed. Rep. of Germany, Dec. 22, 1987, 3743597
Int. Cl.[4] A24D *1/00;* A24C *5/18*
U.S. Cl. 131—364 20 Claims



1. A coaxial cigarette comprising an inner core of a smokable material which burns substantially residue-free, a first wrapper for the inner core, an outer jacket of another smokable material surrounding the inner core, a second wrapper for the outer jacket, and a ventilated coaxial filter comprising a filter core having an internal diameter which corresponds substantially to a diameter of the inner core, and a filter jacket; the filter core having an air-impermeable third wrapper; the filter jacket having an air-permeable fourth wrapper; the first wrapper of the inner core and the second wrapper of the outer jacket being provided with glowing agents; and a draw resistance of the inner core being lower than another draw resistance of the outer jacket.

4,874,005

CURRENT TO PRESSURE TRANDUCER EMPLOYING MAGNETIC FLUID

Robert I. Potter, 11200 Canon Vista, San Jose, Calif. 95127

Filed Dec. 7, 1988, Ser. No. 281,125
Int. Cl.[4] G05D *16/00*
U.S. Cl. 137—85 10 Claims

1. A current-to-pressure transducer comprising:

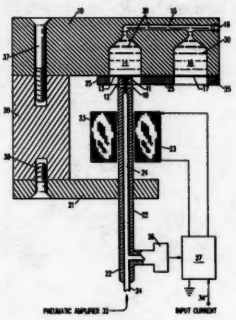
means for supplying a flow of air;

first and second chambers and a means connecting said chambers, each of said chambers having an open end;

magnetic fluid disposed within said chambers and said connection means;

first and second flexible diaphragms respectively positioned against said open ends for containing said fluid within said chambers; and

electromagnetic means energized by an input electrical current for coacting with said magnetic fluid to deform a



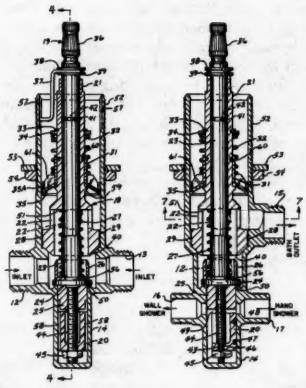
selected one of said diaphragms thereby varying the air pressure in said supply means.

4,874,006

DIVERTER VALVE AND VACUUM BREAKER USABLE THEREWITH

Muhammad Iqbal, Sheboygan, Wis., assignor to Kohler Co., Kohler, Wis.

Filed Jan. 26, 1989, Ser. No. 301,484
Int. Cl.[4] F16K *11/02*
U.S. Cl. 137—119 **6 Claims**



1. A valve assembly for directing fluid flow from at least one inlet to at least three outlets, comprising:

a valve body having an axial bore with at least one radially disposed fluid inlet, a first radially disposed outlet spaced in one direction from said inlet, and second and third radially disposed outlets axially spaced from the first outlet;

valve seat means in the valve body;

a valve stem having a plurality of sealing means attached thereto, the stem being positioned for axial and rotational movement in the valve body and for selective abutting contact of a first sealing means with the valve seat means and a second sealing means with the second and third outlets;

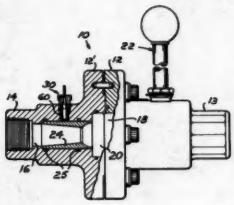
the valve seat means, valve stem, and valve body being configured and juxtaposed such that axial movement of the valve stem can change fluid flow from the first outlet to the second outlet and such that rotation of the valve stem can change fluid flow from the second outlet to the third outlet.

4,874,007

RESTRICTOR VALVE FLOW PASSAGE POP-UP WEAR INDICATOR

Julian S. Taylor, 8300 S.W. 8, Oklahoma City, Okla. 73128

Filed Jan. 12, 1989, Ser. No. 296,114
Int. Cl.[4] G01M *3/28*
U.S. Cl. 137—312 **4 Claims**



1. In a flow restrictor valve having a turbulence diffuser and flow passageway wall protector in its outlet passageway downstream from flow throttling discs and having a lateral bore communicating with a peripheral portion of the diffuser, the improvement comprising:

worn diffuser indicating means in the lateral bore including a tubular body having an outward end and having an annular inwardly facing shoulder intermediate the ends of its bore;

fluid pressure responsive means including a piston having a piston head contained by the inward end portion of said body and including a piston rod projecting toward said end surface axially slidable in said indicating means having a first position normally disposed inwardly of said outer end surface and having a second position projecting outwardly of said outer end surface in response to a worn condition of said turbulence diffuser permitting fluid under greater than atmospheric pressure actuating said pressure responsive means;

a tubular cage surrounding said piston head and having an inward end adjacent said shoulder; and,

a seal ring interposed between the inwardly disposed end of said cage and said annular shoulder.

4,874,008

VALVE MOUNTING AND BLOCK MANIFOLD

John E. Lawson, Horsell Woking, England, assignor to Cameron Iron Works U.S.A., Inc., Houston, Tex.

Filed Apr. 20, 1988, Ser. No. 183,900
Int. Cl.[4] F16K *43/00*
U.S. Cl. 137—315 **6 Claims**

1. A valve and valve mounting comprising

a first mounting member,

a second mounting member spaced from said first mounting member,

a valve having a body, a valve member and a valve actuator,

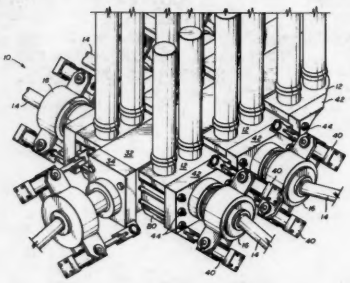
a plurality of hydraulic tensioning members secured by securing means to each of said mounting members, said hydraulic tensioning members having a connection for the supply of hydraulic fluid under pressure whereby said tensioning members are elongated by such pressure,

said mounting members being spaced sufficiently apart to allow said valve body to pass therethrough when said tensioning members are elongated by hydralic pressure,

the body of said valve having a width slightly smaller than the distance between said first and second mounting mem-

bers when said tensioning members are elongated by hydraulic pressure, and

means on said tensioning members for tightening the securing means to one of said mounting flanges while said



tensioning members are elongated under pressure whereby with said valve body positioned between said flanges release of the hydraulic pressure on said tensioning members moves said flanges into tight engagement with said valve body.

4,874,009

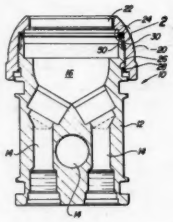
ANTI-SEIZING CAP RING

Daniel A. Pickerrell, Noblesville; Donald C. Schrock, Carmel, both of Ind., and Larry G. Turner, Fenton, Mich., assignors to Masco Corporation of Indiana, Taylor, Mich.

Filed Sep. 6, 1988, Ser. No. 240,330

Int. Cl.[4] F16K *11/02, 51/00*

U.S. Cl. 137—454.6 **7 Claims**



1. A valve housing assembly including:

a body member having ports for water flow and a cavity for receiving a valve mechanism; said body member having a threaded section, and an end shoulder exterior of said cavity

a cap having a central opening for receiving a control handle therethrough, a complementary shoulder section about said opening opposing said end shoulder of said body member and having a complementary threaded section for engagement with said threaded section of said body;

a semi-rigid abutment means interposed between said opposing shoulders for providing an abutment stop as said cap is threadably tightened onto said body;

said semi-rigid abutment means having creep after said cap is tightened onto said body to alleviate seizing forces between said respective threaded sections to allow said cap to be threadably loosened from said body member.

4,874,010

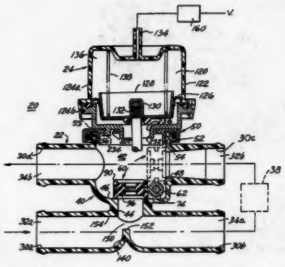
HEATER CONTROL VALVE

Allan W. DeJong, and Paul D. Perry, both of Chatham, Canada, assignors to Siemens-Bendix Automotive Electronics Limited, Chatham, Canada

Filed May 26, 1988, Ser. No. 199,216

Int. Cl.[4] G05D *11/035*

U.S. Cl. 137—484.4 **20 Claims**



1. A fluid control valve comprising:

a valve body defining a chamber and a bypass passage, for receiving fluid, extending therefrom,

first conduit means, in fluid communication with the bypass passage, for defining a first inlet adapted to receive fluid and a first outlet adapted to communicate fluid to an external device;

second conduit means, in communication with the chamber for defining a second inlet, adapted to receive flow from the external device, and a second outlet;

the valve body further including a first seating surface, within the chamber, disposed about a downstream end of the bypass passage and a second seating surface disposed about the second inlet within the chamber;

flow control means for regulating the flow rate of fluid, from the first inlet to the first outlet, to a maximum value, and for prohibiting fluid flow through the external device by terminating fluid communication between the second inlet and second outlet

wherein the flow control means comprises;

a bypass valve, rotatable between a first position in sealing engagement with the first seating surface and a second position in sealing engagement with the second seating surface.

4,874,011

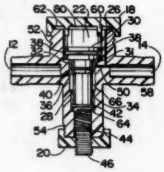
GAS PRESSURE REGULATOR FOR CONTROLLING LOW PRESSURE

Pasquale S. Canzano, 31 Candlewicke Dr., Dover, Del. 19901, and Brock J. Vinton, 501 Greenbank Rd., Wilmington, Del. 19804

Filed Jan. 12, 1989, Ser. No. 296,223

Int. Cl.[4] G05D *16/10*

U.S. Cl. 137—505.13 **14 Claims**



1. A pressure regulator comprising:

(a) a rigid housing having inlet and outlet ports said inlet port being below said outlet port, a hollow interior, having at least two bores, the upper bore disposed above and having a larger inner diameter than the lower bore and the lower bore being below the inlet port, said inlet and outlet ports being in communication with said hollow interior, a top cap sealing the top of the hollow interior and a recycle bore connecting said outlet port with said hollow interior in close proximity to the top cap;

(b) A plunger slidably mounted in the hollow interior of the housing and having a lip and an upper portion disposed directly above a lower portion, said upper portion having a larger cross sectional area than the lower portion and the excess surface area of said upper portion forming said lip at the interface of said upper portion and said lower portion, said plunger having at least two sealing means, an upper sealing means and a middle sealing means being below said upper sealing means, both sealing means being in said upper portion of the plunger;

(c) The plunger being movable between a closed position, said middle sealing means being above said inlet port and below said outlet port and said upper sealing means being above said outlet port; and an open position, said middle sealing means and said upper sealing means being above the outlet port;

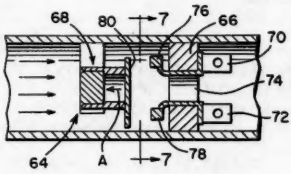
(d) A lower sealing means being below said middle sealing means and below said inlet port.

4,874,012

MAGNETIC OPERATOR FLOW DEVICE

Wallace W. Velie, Alta Loma, Calif., assignor to Mallard Products, Inc., Rancho Cucamonga, Calif.

Filed Oct. 12, 1988, Ser. No. 256,622
Int. Cl.[4] F16K *37/00*
U.S. Cl. 137—557 **6 Claims**



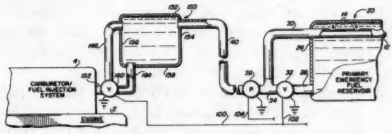
1. A magnetically operated flow device disposed within a flow passage defined by an encircling inwardly facing wall and defining upstream and downstream directions, said flow passage being at 1least generally regular in transverse cross-sectional shape about a central zone of said flow passage, a thin, lightweight, flat and magnetically attracted flow responsive valve plate disposed in said flow passage and movable therein in upstream and downstream directions between upstream and downstream limit positions and constituting a partial drag obstruction to fluid flow through said passage outwardly of said central zone and thus being biased in a downstream direction by fluid flow through said passage in said downstream direction, support means mounted in said central zone upstream from said upstream limit position in spaced relation relative to the wall of said flow passage for fluid flow through said passage in said downstream direction about said support means, said support means including an abutment portion in said central zone projecting from said support means in said downstream direction and defining a downstream facing abutment against which said valve plate may abut to define said upstream limit position thereof with said valve plate disposed generally normal to the longitudinal extent of said passgge, magnet means mounted from said support means centrally in said passage and spaced a predetermined distance upstream from said upstream limit position of said valve plate to define a predetermined gap between said magnet and said valve plate when the latter is in said upstream limit position, said valve plate occupying a sufficient cross-sectional area of said passage outwardly of said central zone to effect said partial drag obstruction, said gap being of a dimension measured longitudinally of said flow passage and the magnetic attraction between said magnet and said valve plate when the latter is in the upstream limit position thereof being sufficiently low such that low gas flow at low differential pressure less than one PSI will be sufficient to shift said valve plate in said downstream direction from said upstream limit position to said downstream limit position, an annular seat body mounted transverse in said passage from said wall with one axial end thereof positioned for abutment by said valve plate when the latter is in said downstream limit position and disposed generally normal to said passage, said valve plate including a central imperforate portion thereof of greater area than the area bound by the inner periphery of said annular seat body, the magnetic attraction between said magnet and valve plate, when the latter is in said downstream limit position and said valve plate is free of differential pressure acting thereon, being sufficient to effect positive magnetic retrieval of said valve plate in said upstream direction from said downstream limit position to said upstream limit position, said valve plate including an outer periphery defining peripherally spaced guide projections in close proximity to said flow passage all for guiding movement of said valve plate between said upstream and downstream limit positions.

4,874,013

EMERGENCY FUEL SYSTEM APPARATUS

J. Roy Hack, Jr., 5405 S. Rosemont, Tucson, Ariz. 85706

Continuation-in-part of Ser. No. 111,818, Oct. 22, 1987, abandoned. This application Nov. 10, 1988, Ser. No. 269,294
Int. Cl.[4] F03B *11/00*; F02M *59/00*
U.S. Cl. 137—571 **16 Claims**



1. In a vehicle having a main tank, an engine, a main fuel conduit extending from the main fuel tank to the engine, and a fuel pump for pumping fuel from the main fuel tank to the engine, emergency fuel reservoir apparatus, comprising, in combination:

primary emergency fuel tank means adjacent to the main fuel tank for holding a first quantity of fuel;

first conduit means extending between the primary emergency fuel tank means and the main fuel conduit;

first valve means in the first conduit means for controlling the flow of fuel from the primary emergency fuel tank means to the main fuel conduit;

secondary emergency fuel tank means disposed adjacent to the engine for holding a second quantity of fuel;

second conduit means extending between the secondary emergency fuel tank means and the main fuel conduit;

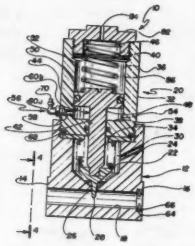
second valve means in the second conduit for controlling the flow of fuel from the secondary emergency fuel tank means to the main fuel conduit; and

means for controlling the first valve means and the second valve means.

4,874,014
FLOW CONTROL MANIFOLD

Robert W. Grant, and William M. Jenson, both of Excelsior, Minn., assignors to FSI International, Inc., Chaska, Minn.

Filed Dec. 21, 1987, Ser. No. 135,939
Int. Cl.[4] F16K *11/22*
U.S. Cl. 137—606 14 Claims



1. A fluid dispensing and metering unit for dispensing a desired fluid amount into a fluid conducting duct, comprising:

(a) a block having a proximal and distal face, and a fluid conducting duct axially extending from said proximal face through said block to said distal face;

(b) means in communication with said fluid conducting duct of said block for dispensing fluid into said duct, said dispensing means intersecting said fluid conducting duct generally intermediate to said proximal block face and said distal block face, said dispensing means comprising:

(1) a flexible bellows mounted in said block creating a fluid tight cavity between said block and said bellows, said cavity having an aperture leading into said fluid conducting duct, said bellows having a tip sealingly engaging said aperture and extending into said duct;

(2) a fluid port, said port extending from outside of the said block into said fluid-tight cavity;

(3) a housing mounted on said bellows forming a chamber between said housing and said bellows, said housing having a hollow housing cavity with a proximal distal end, and a passageway from said proximal end of the hollow cavity to said bellows chamber; and

(4) a piston springable mounted on said distal end of said hollow cavity of said housing, said piston having a longitudinal shaft held in a fluid-tight relation within said housing passageway and extending into said bellows chamber to threadably engage said bellows, and said piston having a larger diameter portion in fluid-tight relation with said housing, said larger diameter portion dividing the hollow housing cavity into an upper and lower portion;

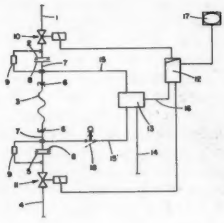
whereby retraction of the piston toward the distal end of the hollow housing cavity draws the bellows towards the housing thereby removing the bellows tip from the aperture and allowing fluids from the fluid port now residing in the fluid cavity to pass through the aperture of the cavity into the fluid conducting duct; and

(c) means connected to said dispensing means for modulating the dispensing of the fluid, said modulating means using a pressurized fluid to interact with the dispensing means for controlling the amount of fluid entering the fluid conducting duct.

4,874,015
MONITORING SYSTEM

Manfred Schirmacher, Bergkamen, Fed. Rep. of Germany, assignor to Schering Aktiengesellschaft, Bergkamen, Fed. Rep. of Germany

Filed Jan. 6, 1989, Ser. No. 294,758
Claims priority, application Fed. Rep. of Germany, Mar. 3, 1988, 3806898
Int. Cl.[4] F16K *35/00*
U.S. Cl. 137—637.05 6 Claims

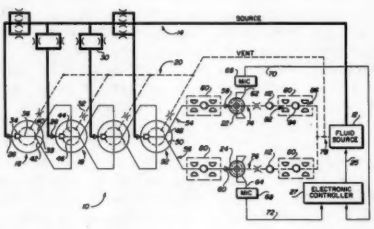


1. In a monitoring system for monitoring the condition of interconnection between at least two pipelines; a connecting line for coupling said pipelines to each other; and shut-off elements for closing the ends of each of said pipelines; the improvement in that said connecting line is electrically-conductive so as to form a closed electrical circuit across the ends of the pipeline which are to be interconnected, said connecting line and a monitoring installation; control means for actuating the shut-off elements for said pipelines being exclusively activatable by the monitoring installation; and at least the monitoring installation including means for determining the operating condition of said electrical circuit.

4,874,016
METHOD FOR IMPROVING SIGNAL-TO-NOISE RATIOS IN FLUIDIC CIRCUITS AND APPARATUS ADAPTED FOR USE THEREWITH

Raymond R. Tseng, Tempe, Ariz., assignor to Allied-Signal Inc., Phoenix, Ariz.

Filed Feb. 28, 1989, Ser. No. 318,094
Int. Cl.[4] F15C *1/08*
U.S. Cl. 137—826 17 Claims



1. A fluidic circuit having a last-stage fluidic amplifier from which fluidic outputs are communicated along two separate flow paths to two separate fluidic oscillators, said circuit being adapted to vent fluid from said oscillators along two initially separate vent paths, said vent paths leading to a common vent, said circuit having circuit elements comprising:

a first low-pass filter interposed in one of said flow paths between said last-stage amplifier and one of said oscillators;

a second low-pass filter interposed in the other of said flow

paths between said last-stage amplifier and the other of said oscillators;

a third low-pass filter interposed in one of said vent paths between said one oscillator and said common vent; and

a fourth low-pass filter interposed in the other of said vent paths between the other of said oscillators and said common vent.

4,874,017

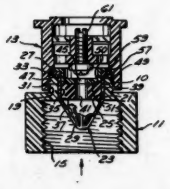
SCREEN AND FLOW REGULATOR ASSEMBLY

Donald W. Hendrickson, P.O. Box 999, Corona, Calif. 91718

Continuation-in-part of Ser. No. 27,440, Mar. 18, 1987, Pat. No. 4,830,057. This application Mar. 10, 1988, Ser. No. 160,727

Int. Cl.[4] F15D *1/02*

U.S. Cl. 138—45 **3 Claims**



1. A fluid flow regulator assembly adapted to be held by a pair of fittings within the mouth of a fluid flow channel, comprising:

an elastomeric, generally disc-shaped flow restrictor which controls the flow of fluid by permitting a controlled volumetric rate of fluid flow through a bore extending through said restrictor;

a molded, non-threaded housing for said flow restrictor, said housing including an interior wall partially forming a chamber on the downstream end of the housing in which said flow restrictor is removably insertable, an axially thin, flat outwardly extending flange surrounding said chamber on said downstream end clampable between said pair of fittings to hold said housing at said mouth of said fluid channel, structure on the upstream end of said housing for confining said restrictor within said chamber, said structure defining an opening communicating with said fluid flow channel; and

a cap removably secured to the downstream end of said housing to capture said restrictor in said chamber and forming with said housing a replaceable assembly to be held by said fittings, said cap including a bore for communicating with said fluid flow channel, said cap and said restrictor cooperating to form a gap between the cap and a portion of said restrictor, said gap permitting said restrictor to flex in the downstream direction in response to the input pressure of fluid against said restrictor.

4,874,018

TRANSMISSION FOR WEAVING LOOMS

Philippe Van Bogaert, Schaarbeek, and André Vandenbroucke, Langemark, both of Belgium, assignors to Picanol N.V., Ieper, Belgium

Continuation of Ser. No. 33,736, Apr. 3, 1987, abandoned. This application Feb. 21, 1989, Ser. No. 312,389

Claims priority, application Netherlands, Apr. 7, 1986, 8600870

Int. Cl.[4] D03D *51/08*

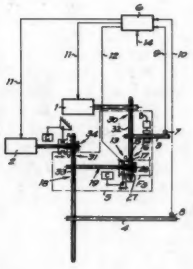
U.S. Cl. 139—1 E **9 Claims**

1. In a drive system for weaving machines including a main drive shaft for the machine batten arranged to be rotated at a first drive speed, an auxiliary drive shaft for the machine heddles arranged to be rotated at a second drive speed, said main and auxiliary drive shafts connected together through a coupling means for synchronous rotation at selected rotational angular positions relative to each other, the improvement comprising:

said coupling means arranged to be remotely controlled between locked and unlocked condition responsive to coupling locking signals, said main and auxiliary drive shafts being locked against relative rotation when the coupling means is locked and relatively rotatable when the coupling means is unlocked, and said coupling means being arranged to lock and unlock said main and auxiliary drive shafts at a large number of different relative angular positions;

a coupling control means for controlling locking and unlocking of said coupling means;

a main and auxiliary drive motor means connected in driving relationship with the main and auxiliary drive shafts, respectively, operation of said drive motor means being controlled at least in part by main and auxiliary motor drive control signals;



angular position detecting means for determining the relative angular positions of said main and auxiliary drive shafts and for generating angular position signals related to the detected relative angular positions of the shafts;

said coupling control means arranged to receive said angular position signals; to receive a set value corresponding to the desired angular relationship between said main and auxiliary drive shafts; and to generate said coupling locking signals and said main and auxiliary motor drive control signals in response thereto;

whereby said main and auxiliary drive shafts can be uncoupled from each other at the coupling means, rotated relative to each other by at least one drive motor means and recoupled at the coupling means in a different relative angular relationship corresponding to a set value under the control of said coupling control means.

4,874,019

WALLCOVERING SUBSTRATE FORMED OF TEXTURED, CONTINUOUS, MULTI-FILAMENT YARNS HAVING HYDROPHILIC CHARACTERISTICS

James H. Whetstone, 3012 Lake Forest Dr., Greensboro, N.C. 27408

Division of Ser. No. 146,968, Jan. 22, 1988. This application Mar. 27, 1989, Ser. No. 329,288

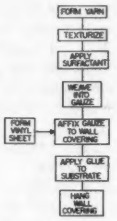
Int. Cl.[4] D03D *15/10*

U.S. Cl. 139—420 A **7 Claims**

1. Improved gauze formed primarily of textured, continuous, multi-filament, polymeric yarns having a surfactant incor-

porated into the interfilamentary structure thereof; said surfactant having the characteristics of:

(a) being water dispersible and water insoluble;



(b) having an HLB factor in the range of 7–10; and

(c) being heat stable to at least 350° F.

4,874,020

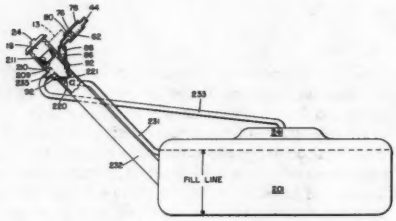
SYSTEM FOR CONTROLLING THE RELEASE OF FUEL VAPORS FROM A VEHICLE FUEL TANK

George H. Bucci, Tolland, Conn., assignor to Whitehead Engineered Products, Inc., Meriden, Conn.

Continuation-in-part of Ser. No. 31,030, Mar. 26, 1987. This application Oct. 5, 1988, Ser. No. 253,855

Int. Cl.[4] B65D *90/28*

U.S. Cl. 141—59 **20 Claims**



13. Apparatus for controlling the release of fuel vapors from a vehicle fuel tank comprising:

(a) a cap;

(b) first means for carrying fuel to the fuel tank, said first means being sized to receive a fuel pump nozzle and having a mouth at one end through which the fuel pump nozzle enters the means;

(c) second means for attaching the cap to the mouth to seal closed the mouth;

(d) third means for carrying fuel vapors from the first means to a vapor capture device, said third means being connected to the first means at a level below the mouth;

(e) fourth means for opening and closing the third means, said fourth means being operated by the attachment and detachment of the cap to the mouth such that attachment moves the cap into contact with the fourth means to close said means and detachment moves the cap out of contact with the fourth means to open said means, said fourth means also opening when the cap is attached and the pressure within the third means exceeds a predetermined value;

(f) fifth means for carrying fuel vapors from the fuel tank to the first means, said fifth means being connected to the first means at a level below the mouth;

(g) sixth means for coordinated opening and closing of the first and fifth means, said sixth means being operated by the insertion of a fuel pump nozzle into and the removal of a fuel pump nozzle from the first means such that insertion causes the first means to open and the fifth means to close and removal causes the fifth means to open and the first means to close, said closure of the first means occurring at a level below the mouth, above the level at which the third means connects to the first means, and above the level at which the fifth means connects to the first means.

4,874,021

ASEPTIC FILLING UNIT FOR PACKING MACHINES FOR LONG-LASTING PRODUCTS WITH FLUID BEHAVIOR

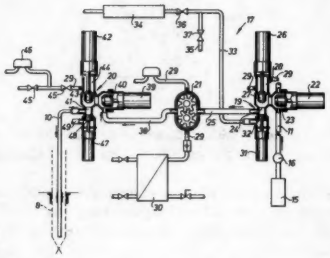
Ulf Ringdahl, Löddeköpinge, Sweden, and Vittorio Mattei, Modena, Italy, assignors to Tetra Dev-Co., Modena, Italy

Continuation of Ser. No. 812,401, Dec. 20, 1985, abandoned. This application Jun. 8, 1988, Ser. No. 205,499

Claims priority, application Italy, Dec. 28, 1984, 24286/84

Int. Cl.[4] B65B *3/04*

U.S. Cl. 141—85 **9 Claims**



1. In an apparatus for the aseptic filling of fluid products into containers, by means of packing machines of the type wherein a feed pipe feeds the products from a supply line under sterile conditions into said containers, the improvement comprising:

a metering unit for metering the fluid products to be fed into the containers, said metering unit arranged between a feed pipe and a supply line; isolation means for selectively connecting the metering unit to the supply line, the feed pipe, a source of sterlizing fluid, and a washing unit, said isolation means being positioned between said products feed pipe and said products supply line, said isolation means including two valve groups, between said valve groups the metering unit is connected by related pipes;

the isolation means including means for forming an aseptic seal barrier between the metering unit and the supply line and between the metering unit and the feed pipe; and

wherein each of said valve groups has three valves.

4,874,022

FILLING STATION FOR A CARTRIDGE FILLING AND SEALING MACHINE

Ernst Schwerdtel, Munich, and Hans-Jörg Lang, Eisenhofen, both of Fed. Rep. of Germany, assignors to Ludwig Schwerdtel GmbH, Karlsfeld, Fed. Rep. of Germany

Filed May 5, 1988, Ser. No. 195,781

Claims priority, application Fed. Rep. of Germany, May 14, 1987, 3716119

Int. Cl.[4] B65B *43/58*

U.S. Cl. 141—165 **21 Claims**

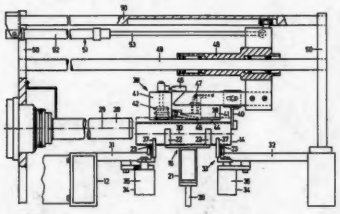
1. A filling station for a cartridge filling and sealing machine for filling viscous or pasty materials into cylindrical cartridges, comprising:

a filler valve;

a positioning and centering device for positioning and centering the cartridges in a position in alignment with said filler valve,

a displacement drive for adjusting the position of said positioning and centering device and the filler valve in relation to each other; and

said positioning and centering device comprising a unit having a contact surface for the cartridges and at least one



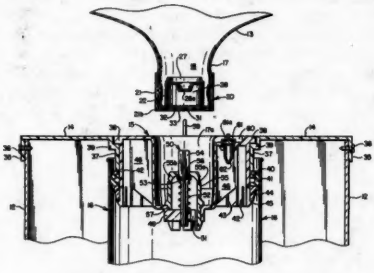
vacuum suction holder disposed in said unit, said at least one vacuum suction holder comprising a suction hose having an open end disposed in said unit, the open end of said suction hose extending beyond said contact surface and being in the shape of a bellows.

4,874,023

DECAP DISPENSING SYSTEM FOR WATER COOLER BOTTLES

John G. Ulm, Upper Sandusky, Ohio, assignor to Liqui-Box Corporation, Worthington, Ohio

Filed Sep. 30, 1988, Ser. No. 251,267
Int. Cl.[4] B65B *3/04*
U.S. Cl. 141—346 **18 Claims**



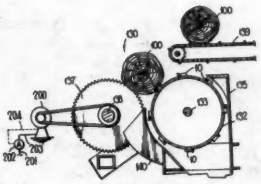
1. In combination a container for liquid having a projecting neck through which the liquid is dispensed, a cap and valve assembly for said neck, said cap and valve assembly having an outwardly opening socket for receiving the neck and a valve guide, a slider valve slidably mounted within the valve guide and controlling flow of liquid from the neck, a dispenser having an upwardly-opening reservoir for receiving said liquid, said reservoir having an annular wall, a neck-receiving socket member having a depending annular skirt depending into said reservoir and spaced from said annular wall, said socket member having a socket for receiving said neck which has an outlet, a slidable valve for controlling said outlet, said slidable valve comprising an upstanding guide and a slidable valve stem therein projecting upwardly above the guide, said stem having a valve head thereon, said upstanding guide having a seat, and a spring on said guide which normally biases the head onto said seat, and sealing means between the annular skirt on the socket member and the annular reservoir wall for providing an hermetic seal therebetween, said sealing means being in the form of a flexible gasket of C-cross-section, and means for expanding the gasket, said expanding means comprising means for producing relative axial movement between the annular skirt on the socket member and the annular wall of the reservoir.

4,874,024

WOOD PROCESSING DEVICE HAVING SELF-REVERSING FEATURE

Stanley Arasmith, P. O. Box 2458, Rome, Ga. 31064

Division of Ser. No. 124,043, Nov. 23, 1987, Pat. No. 4,802,631, which is a division of Ser. No. 917,855, Oct. 14, 1986, Pat. No. 4,776,375. This application Dec. 2, 1988, Ser. No. 278,737
Int. Cl.[4] B27B *1/00*; B77C *1/00*
U.S. Cl. 144—174 **2 Claims**



1. A wood processing apparatus comprising: an elongate cylindrical drum rotatably mounted about a horizontal longitudinal axis;

at least one cutter extending outwardly from the surface of said drum

means for rotating said cylindrical drum about its longitudinal axis in a first direction such that said cutter follows a circular path;

feed means for mounted rotation adjacent to said drum in a direction opposite to said first direction for feeding said wood into said path of said cutter;

sensing means for sensing a predetermined level of power required to rotate said feed means; and

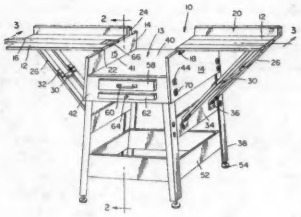
reversing means responsive to said sensing means for reversing the rotational direction of said feed means.

4,874,025

MITER SAW UTILITY STAND

Gary D. Cleveland, 1014 June St., New Bedford, Mass. 02745

Filed May 16, 1988, Ser. No. 194,196
Int. Cl.[4] B25H *1/16, 1/14, 1/06*
U.S. Cl. 144—287 **16 Claims**



1. A miter saw utility stand comprising:

a pair of wing means for supporting a workpiece, each of said wing means extending longitudinally and having an opening separating them;

a pair of fence means for bracing the workpiece, each of said fence means being mounted perpendicular to and flush with a longitudinal edge of a respective one of said wing means;

a pair of first adjustable sidewall means for adjusting the height of said wing means, said pair of first adjustable

sidewall means being connected to the transverse edges of said pair of wing means;

table top means for holding the saw, said table top means being located below and parallel to a plane created by the length of said pair of wing means, the width of said table top means being about equal to the length of the opening separating said pair of wing means;

a pair of brace means for supporting said pair of wing means, one end of each of said brace means being mounted to a respective one of said wing means;

a pair of second adjustable sidewall means for adjusting the height of said pair of brace means and said pair of wing means relative to said table top means, each of said second adjustable sidewall means being connected to a respective one of said brace means; and

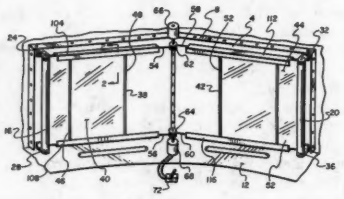
leg means for supporting said pair of first and second adjustable sidewall means and said table top means, said leg means being connected to said pair of first and second adjustable sidewall means and said table top means.

4,874,026

VEHICLE WINDOW SCREEN ASSEMBLY

Dayer Worrall, 1345 E. Lester, South Weber, Utah 84403

Filed Apr. 4, 1988, Ser. No. 177,061
Int. Cl.[4] E06B *9/08*
U.S. Cl. 160—23.1 **16 Claims**



1. A retractable window screen assembly for covering a vehicle window and the like comprising

a first flexible screen for blocking at least a portion of light impinging thereon, said screen having a top edge, a bottom edge and a free end,

a first spring-loaded, generally cylindrical roller about which the screen is wrapped, with the free end exposed, said roller being mountable at its ends in a position oriented generally vertically adjacent to a side of the vehicle window so that when the free end of the screen is pulled horizontally toward the opposite side of the window, the roller rotates to unwind the screen, and when the free end is released, the roller retracts and rolls up the screen,

screen positioning means attached to the free end of the screen and controllable to selectively pull the screen horizontally toward the opposite side of the window to substantially cover the window, or release the screen to allow it to be retracted and rolled up on the roller,

first guide means attached to the window adjacent the top edge and bottom edge of the screen when it is unrolled from the roller for holding the top and bottom edges of the screen in close proximity to the window to produce an air pocket between the screen and the window, and

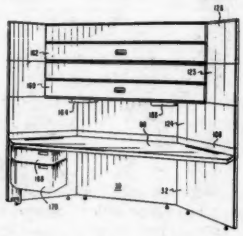
a pair of elongate, flexible metallic strips, one of which is attached to extend along the top edge of the screen and the other of which is attached to extend along the bottom edge of the screen, and wherein said guide means comprises a pair of strip magnets attached to the window, each in general alignment with the respective metallic strip when the screen is unrolled from the roller to attract and hold the metallic strips for sliding engagement and movement along the said strip magnets as said screen is unrolled from and rolled back onto said roller.

4,874,027

OFFICE SPACE DIVIDING ARRANGEMENT

Bruce K. Boundy, Alto, Mich., and Raoul J. P. Schoumaker, Greenbay, Wis., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 20, 1988, Ser. No. 197,018
Int. Cl.[4] F06B *9/24*; A47B *5/00*
U.S. Cl. 160—230 **33 Claims**



1. An office space dividing arrangement, comprising:

at least one work station,

said at least one work station including a first module having first and second sides, first and second ends, and upper and lower edges which extend between said ends,

said first module having at least one joint, said at least one joint defining a bend line which extends between said upper and lower edges to define at least first and second integrally joined sections,

said first module being in a functional configuration in which said at least first and second sections intersect at a first predetermined angle to define a free-standing base portion of said at least one work station,

said first module being foldable along said bend line to a shipping configuration which minifies shipping space,

a work surface supported by the upper edge of the first module, with the first side facing the work surface,

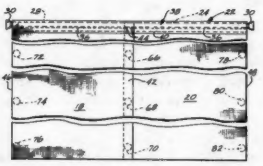
and a flexible skin on the second side which extends uninterruptedly between the first and second ends.

4,874,028

TEMPORARY DETACHABLE DOORWAY SCREEN APPARATUS

Carol J. Lynch, and Debbie J. Corday, both of 18550 Hatteras St. #92, Tarzana, Calif. 91356

Filed May 6, 1988, Ser. No. 190,887
Int. Cl.[4] A47H *23/01*
U.S. Cl. 160—332 **7 Claims**



1. Temporary detachable doorway screening apparatus for a doorway defined by a door frame having a top frame member spaced above a floor and vertical side members extending from the floor to the top frame member, thereby forming an enclosed area within an open doorway of a dwelling, the apparatus comprising:

a flexible sheet of screening material shaped to cover substantially the entire enclosed area within said open doorway, the flexible sheet being made from a flexible polymeric mesh for allowing passage of light and air while preventing annoying pests from entering through the doorway and having upper, lower and vertical margins which also enhance flexibility so the entire sheet of screening material can be rolled up or unrolled for positioning it to cover the enclosed are within the doorway,

the sheet of screening material being provided as a pair of side-by-side screen sections normally separated from one another and overlapping vertically along a central portion of the screen to form an opening along the overlapped portions of the screen sections,

an elongated tension rod adjustable in length to apply spring pressure at its ends to the side frame members of the door frame for frictionally and releasably holding the tension rod above the door opening,

means for securing the tension rod to a top portion of the screen,

means providing vertically spaced apart fastener elements along the overlapping center portion of the screen for releasably opening or closing the screen from the floor continuously upwardly for most of the height of the screen; and

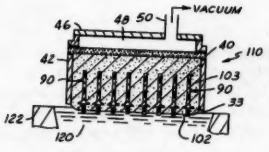
means providing vertically spaced apart fastener elements along the vertical outer margins of the screen sections for releasable attachment to cooperating vertically spaced apart fastener elements releasably secured in a non-marring fashion to the side frame members of the door frame.

4,874,029

COUNTERGRAVITY CASTING PROCESS AND APPARATUS USING DESTRUCTIBLE PATTERNS SUSPENDED IN AN INHERENTLY UNSTABLE MASS OF PARTICULATE MOLD MATERIAL

George D. Chandley, Amherst, N.H., assignor to General Motors Corporation, Detroit, Mich.

Filed May 9, 1988, Ser. No. 191,544
Int. Cl.[4] B22C *9/04*; B22D *18/06*
U.S. Cl. 164—34 101 Claims



1. A method for the countergravity casting of molten metal comprising:

(a) holding an inherently unstable mass of particulate mold material in an open bottom container around a destructible pattern therein by exerting external fluid pressure on a bottom side of the mass exceeding the internal pressure in said container,

(b) relatively moving the container and an underlying molten metal pool to place said bottom side in the molten metal pool, and

(c) drawing molten metal through an ingate between the bottom side and the pattern to destroy and replace the pattern in said mass when the bottom side is placed in the molten metal pool.

43. A countergravity casting mold comprising:

(a) a container having an open bottom end,

(b) an inherently unstable mass of particulate mold material defining a metal-receiving molding cavity in the container, said mass having a bottom side for contacting an underlying molten metal pool,

(c) a destructible pattern embedded in the mass and shaping said cavity,

(d) ingate means between said pattern and bottom side, and

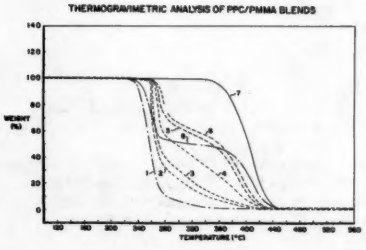
(e) means for establishing a negative pressure differential between the inside and the outside of said container sufficient to hold the particulate mold material in the container around the pattern.

4,874,030

BLENDS OF POLY(PROPYLENE CARBONATE) AND POLY(METHYL METHACRYLATE) AND THEIR USE IN DECOMPOSITION MOLDING

Jeffrey A. Kuphal, Blandon; Lloyd M. Robeson, Macungie, and James J. Weber, Allentown, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Mar. 22, 1989, Ser. No. 326,938
Int. Cl.[4] B22C *9/02*
U.S. Cl. 164—34 6 Claims



1. A method of pattern casting which comprises forming a pattern from a foamed blend of a polymer of propylene carbonate units and a polymer of methyl methacrylate within a shell, pouring molten metal into said shell in contact with said foamed blend, thereby decomposing said polymers, and permitting the decomposition products from said polymers to leave said shell as gases during said pouring step.

4,874,031

CANTILEVERED INTEGRAL AIRFOIL METHOD

David F. Janney, 930 San Pedro, Coral Gables, Fla. 33156

Division of Ser. No. 718,347, Apr. 1, 1985, abandoned. This application Jan. 27, 1987, Ser. No. 6,987
Int. Cl.[4] B21K *3/04*; B22D *23/00*
U.S. Cl. 164—76.1 5 Claims

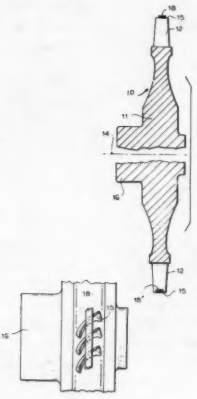
1. The method of forming a cantilevered airfoil integral casting blank comprising the steps of,

forming an investment casting mold for molding said cantilevered airfoil,

adding to said mold a cavity forming means, said cavity connecting the peripheral portions at the ends of each of said blades to define, upon casting, a stabilizing band,

filling the mold from a location to direct molten metal to flow toward the stabilizing bands, and fill the cavity which is to become the stabilizing band,

removing the thus-cast turbine wheel blank with stabilizing bands from the mold,



removing the stabilizing band from the ends of the airfoil blades.

4,874,032

DIE CASTING CONTROLLING METHOD

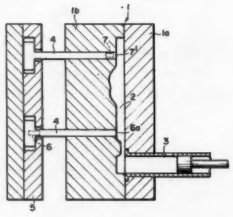
Yotaro Hatamura, 12-11, Kohinata 2-chome, Bunkyo-ku, Tokyo, Japan

Continuation of Ser. No. 96,977, Sep. 14, 1987, abandoned. This application Mar. 27, 1989, Ser. No. 331,083

Claims priority, application Japan, Sep. 13, 1986, 61-216824; Sep. 13, 1986, 61-216825; Sep. 13, 1986, 61-216826; Nov. 17, 1986, 61-274564

Int. Cl.[4] B22D *17/32*

U.S. Cl. 164—457 **5 Claims**



1. A method of controlling a die casting operation, comprising the steps of:

(a) directly measuring:

(i) injection pressure of molten metal into a cavity continuously throughout a casting cycle by at least one pressure sensor mounted in a die;

(ii) pressure of said molten metal adjacent a pouring gate, continuously throughout the casting cycle by at least one pressure sensor;

(iii) pressure of said molten metal far away from said pouring gate, continuously throughout the casting cycle by at least one pressure sensor; and

(iv) temperature and heat flux of the cavity surface continuously throughout the casting cycle at at least two positions by at least one temperature sensor mounted in the die;

(b) comparing measured values obtained from step (a) with reference pressure and temperature values; and

(c) controlling said die casting operation in response to said comparison.

4,874,033

RAPID WARMER FOR BLOOD AND BLOOD PRODUCTS

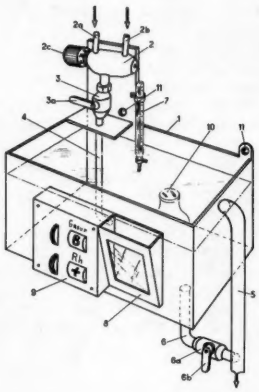
Marie L. Nicholas Marchiani Chatelain, Le Lesdiguères, Résidence St. Mury 38240, Meylan, France (F-38240), and Jean-Pierre Pellini, Tèche, Vinay, France (F-38470)

Filed Nov. 24, 1987, Ser. No. 124,611

Claims priority, application France, Nov. 28, 1986, 86 16859

Int. Cl.[4] A61M *1/36*; A61F *7/00*

U.S. Cl. 165—1 **17 Claims**



8. A process for warming or defrosting products for injection or perfusion, particularly blood products, contained in hermetically sealed bottles or bags, comprising the steps of:

filling up and continuously circulating water in an upwardly opened cell by water circulating means comprising an inlet line and an overflow outlet line;

controlling the temperature and the flow rate of the water by means of an adjustable thermostatic tap connectable on the one hand to a cold water distribution network and on the other hand to a hot water distribution network, and an adjustable flow control valve, said adjustable thermostatic tap and said adjustable flow control valve being fitted in said inlet line of the water circulating means, said overflow outlet line forming an overflow for draining the water and having an inlet provided at an upper part of said cell, the outlet of said temperature controlled water inlet line opening into a lower part of said cell adjacent a first lateral side of said cell, the inlet of said overflow outlet line being located adjacent a second lateral side of said cell opposite said first side;

introducing at least one bottle or bag of product into said cell such that said at least one bottle or bag of product is submerged by the temperature controlled water continuously circulating around the at least one bottle or bag; and

removing the at least one bottle or bag of product from the cell when the product contained therein is warmed or defrosted.

4,874,034

REFRACTORY UNIT FOR A HEAT REGENERATOR

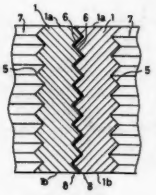
Kimio Hirata, and Yasuo Saito, both of Chiba, Japan, assignors to Toshiba Monofrax Co., Ltd., Katori, Japan

Filed Feb. 24, 1988, Ser. No. 159,939

Claims priority, application Japan, Mar. 3, 1987, 62-46680; Jul. 21, 1987, 62-180015; Jul. 21, 1987, 62-180016

Int. Cl.[4] F28D *17/02*

U.S. Cl. 165—9.1 15 Claims



1. A refractory unit for a heat regenerator comprising a unit body having a first end surface, a second end surface, an outer wall, an inner wall, a flow passage formed by the inner wall and extending between the first and second end surfaces, the flow passage having a center line, the outer wall including a series of concave and convex strips, the inner wall including a series of concave and convex strips, and four corners adapted to engage with corresponding corners of other adjacent refractory units when said units are arranged, thereby to form a further flow passage defined by the outer walls of the refractory units, each of the corners having a series of concave and convex strips;

wherein all of the refractory units are substantially the same in shape and include means for engaging with one another in a fitting condition by alternately turning the refractory units upside down.

4,874,035

HEAT EXCHANGER FOR COOLING TOWER

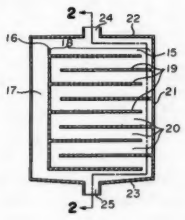
Ken Kashiwada, Fujisawa; Tadanobu Muto, Tokyo, and Tetsuo Sasaki, Fujisawa, all of Japan, assignors to Shinwa Sangyo Co., Ltd., Tokyo, Japan

Filed Aug. 16, 1988, Ser. No. 233,265

Claims priority, application Japan, Nov. 17, 1987, 62-290120; Nov. 25, 1987, 62-295045; Nov. 27, 1987, 62-297732

Int. Cl.[4] F28F *3/04*

U.S. Cl. 165—38 5 Claims



1. A heat exchanger for cooling tower comprising a plurality of thin, flat liquid-flowing passages and a plurality of thin, flat air-flowing passages which are alternately interposed between the adjacent liquid-flowing passages, each of said liquid-flowing passages being separated from each of said air-flowing passages by a heat exchanging partition plate made of a metallic plate or a synthetic resin plate so as not to have air contact with liquid passed therethrough, said heat exchanger being characterized in that deflectors are arranged on the surface of each of said partition plates in the direction of its width so as to project toward said liquid-flowing passages to thereby form a liquid-falling speed reducing part, and a vertically extending overflowed-liquid escaping conduit is formed adjacent said liquid-falling speed reducing part by means of a dam.

4,874,036

HEATING AND AIR CONDITIONING SYSTEM FOR A FORKLIFT

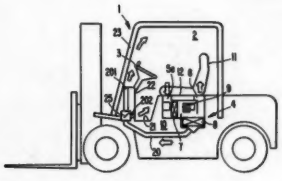
Kenji Masuda, Nitta, Japan, assignor to Sanden Corporation, Gunma, Japan

Filed Jul. 14, 1988, Ser. No. 218,987

Claims priority, application Japan, Jul. 14, 1987, 62-106925[U]; Jul. 14, 1987, 62-106926[U]

Int. Cl.[4] B60H *1/00*

U.S. Cl. 165—42 9 Claims



1. A heating and air conditioning system for a forklift having a cabin with a seat and a front glass, said heating and air conditioning system comprising a heating and air conditioning unit disposed within an engine room located below the seat, said heating and air conditioning unit comprising an evaporator, a fan, and a heater core, said heating and air conditioning unit having an air flow path between said evaporator and said fan and an air flow path between said fan and said heater core, wherein said heater core is positioned below said fan at a substantially right angle to said evaporator so that the air flow path between said evaporator and said fan is substantially perpendicular to the air flow path between said fan and said heater core, an inlet port disposed on said heating and air conditioning unit adjacent said evaporator, a first outlet port disposed on said heating and air conditioning unit adjacent said heater core, and a duct having a first and adjacent said heater core and a second end extending to a front portion of the cabin under the floor of the cabin.

4,874,037

APPARATUS FOR COOLING A HOT PRODUCT GAS

Gero Papst, Kaarst, Fed. Rep. of Germany, and Michael Nagl, Linz, Austria, assignors to Korf Engineering GmbH, Fed. Rep. of Germany and Voest-Alpine Aktiengesellschaft, Austria

Filed Jul. 18, 1985, Ser. No. 756,294

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1984, 3427088

Int. Cl.[4] F28F *19/00;* C10J *3/68;* F28D *21/00*

U.S. Cl. 165—47 9 Claims

1. Apparatus for cooling a flowing hot product gas containing tacky particles which lose their tackiness on cooling, comprising:

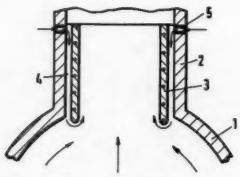
an outer wall of a means emitting said hot product gas containing tacky particles having a longitudinal axis, an upstream portion which converges in the direction of the flow of the hot product gas and a tubular portion which intersects said upstream portion and has a longitudinal axis, the hot product gas flowing into said tubular portion from said converging portion with said converging portion turning the flow of hot product gas radially inwardly

of the tubular portion toward said tubular portion longitudinal axis;

an annular tubular insert wall positioned within said outer wall tubular portion and being spaced therefrom to define an annular gap between said tubular insert wall and said outer wall tubular portion, said annular gap extending axially of said insert wall, said tubular insert wall having an upstream end and a downstream end, with said upstream end being located adjacent to the intersection of said outer wall tubular portion and said converging portion;

a cooling gas inlet port in said outer wall tubular portion for guiding cooling gas into said annular gap, said inlet port being located nearer to said tubular insert wall downstream end then to said upstream end so that cooling gas flowing into said annular gap from said inlet port flows upstream of the hot product gas flow direction;

said tubular insert wall upstream end defining with said outer wall a cooling gas outlet port, said cooling gas outlet



port opening into the hot product gas and being oriented to direct cooling gas upstream into the flowing hot product gas;

the configuration of the insert wall upstream end and its position with respect to the upstream portion of the means emitting the hot product gas being arranged to cause said cooling gas to flow in said annular gap and to contact said annular tubular insert wall and to flow into the hot product gas adjacent to the cooling gas outlet port at an angle to the flow direction of hot product gas flowing past said outlet port, said cooling gas being turned radially inward and then back into the flow direction of the hot product gas to flow around said insert wall upstream end and back along said tubular insert wall to be positioned between the hot product gas and said insert wall for essentially the entire length of said insert wall whereby cooling gas defines a film which prevents the tacky particles from contacting said insert wall and cools the hot product gas and said insert wall.

4,874,038

ECONOMICAL HOUSE AIR COOLING ARRANGEMENT

George E. Ehlert, 1111 Wadsworth Avenue, North Chicago, Ill. 60064

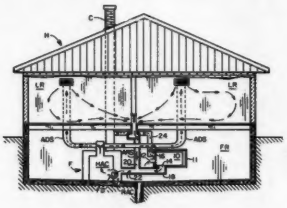
Filed Feb. 14, 1989, Ser. No. 309,866
Int. Cl.[4] F25B *29/00*; F25D *23/12*
U.S. Cl. 165—48.1 4 Claims

2. An economical air cooling arrangement for installation in a house having living rooms, a furnace room separate from the living rooms, a chimney extending to the outside of the house from the furnace room, and a conventional forced air heating system that includes a furnace located in the furnace room and having hot air and cold air chambers, an air delivery system connected to the furnace hot air chamber for delivering air from the furnace to the living rooms in the house, an air return system connected to the furnace cold air chamber for returning air from the living rooms to the furnace, and a blower in the furnace for forcing air from the air return system through the furnace into the air delivery system, said arrangement comprising:

(a) a conventional window mountable type of air cooling and dehumidifying unit located in the furnace room, and which has an air intake opening and separate cool air and warm air discharge openings;

(b) means connecting said unit cool air discharge opening directly to a return duct of the air return system;

(c) said return duct having an air intake opening located in the furnace room between the furnace and said means



connecting said unit cool air discharge opening to the air return system;

(d) means connecting said unit warm air discharge opening to said chimney;

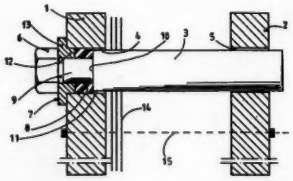
(e) means for venting air from the furnace room into said unit air intake opening.

4,874,039

PLATE HEAT EXCHANGER

Bo Nilsson, Kävlinge, Sweden, assignor to Alfa-Laval Thermal AB, Tumba, Sweden

PCT No. PCT/SE87/00634, § 371 Date Jun. 28, 1988, § 102(e) Date Jun. 28, 1988, PCT Pub. No. WO88/05520, PCT Pub. Date Jul. 28, 1988
PCT Filed Dec. 28, 1987, Ser. No. 216,540
Claims priority, application Sweden, Jan. 16, 1987, 8700162
Int. Cl.[4] F28F *3/08*
U.S. Cl. 165—78 10 Claims



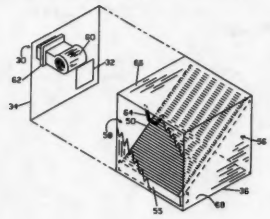
1. Plate heat exchanger comprising a frame plate, a pressure plate, heat exchange plates clamped between said frame plate and said pressure plate and a carrying bar for supporting said plates, each of said pressure plates and said heat exchange plates having holes for receiving said carrying bar, said carrying bar passing through said hole in said pressure plate and extending at least a distance into said hole in said frame plate, said pressure plate being slidable on said carrying bar, said pressure plate and said frame plate being identical so that the hole for the carrying bar in the frame plate is identical to the hole for the carrying bar in the pressure plate and a locking device for fastening the carrying bar in the frame plate.

4,874,040

UNIVERSAL HEAT EXCHANGER

Donald C. Herrmann, 6902 Doral, North Lauderdale, Fla. 33068

Filed Jul. 1, 1988, Ser. No. 214,427
Int. Cl.[4] F24H *3/06*; F28H *13/12*
U.S. Cl. 165—122 13 Claims



1. A heat exchanger for use in any of a number of possible configurations, comprising in combination:

a rectangular housing means having a top, a bottom and a removable first panel, said first panel having a first surface having surface area and with four corners including a first and a second corner situated diagonally opposite one another, and a third and fourth corner situated diagonally opposite one another;

heat exchanging means situated approximately diagonally within said housing spanning from approximately said third corner to said fourth corner such that said housing is partitioned into a first chamber adjacent said first corner and a second chamber adjacent said second corner;

return means, situated near first corner on said first surface and occupying less than approximately ¼ of said surface area, for coupling air to said first chamber;

supply means, situated near said second corner on said first surface and occupying less than approximately ¼ of said surface area, for coupling air from said second chamber; and

air circulation means, situated within one of said first and second chambers and coupled to said first panel, for forcing air to pass by said heat exchanging means and thereby pass from said first chamber to said second chamber; whereby, said first panel may be rotated by 180 degrees to reverse the direction of air flow through said heat exchanging means and reverse the orientation of said supply means and said return means.

4,874,041

BAR SUPPORT SHIM AND METHOD

David L. Crick, and James K. Hayes, both of Chattanooga, Tenn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Oct. 19, 1987, Ser. No. 109,874
Int. Cl.[4] F28D *7/00*
U.S. Cl. 165—162 5 Claims

1. In a nuclear steam generator having anti-vibration bars for limiting the motion of spaced heat exchanging tubes, the improvement comprising:

a shim located between every n^{th} tube,

said shims having a thickness equal to n times the dimensional difference (x−y) of the distance x between a pair of tubes and the width y of an anti-vibration bar between the tubes, where n is greater than one.

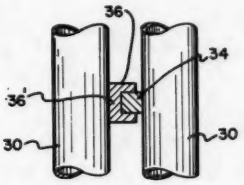
5. The method of reducing vibration damage to heat exchanging tubes of a tube bundle in nuclear steam generators having anti-vibration bars located between the tubes and attached at their ends to wrap-around bars on the outside of the tube bundle, which method includes the step of:

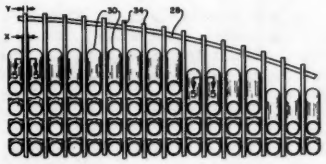
cutting and removing the wrap-around bars from the outside of the tube bundle;

inserting and expanding a bladder to spread a pair of tubes in the bundle on opposite sides of an anti-vibration bar apart;

moving the anti-vibration bar between the pair of tubes to one side of the opening created by the bladder;

inserting a shim of modular lengths between the anti-vibration bar and one tube of said pair of tubes;





repeating the bladder inserting and expanding, the anti-vibration bar moving and the shim inserting steps at intervals along the bundle; and

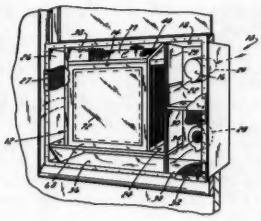
welding a wrap-around bar to the ends of the anti-vibration bars on the outside of the tube bundle.

4,874,042

CORRUGATED CARDBOARD HEAT EXCHANGER

William Becker, Rte. #1, Princeton, Wis. 57968

Filed May 27, 1988, Ser. No. 199,525
Int. Cl.[4] F28F *3/10*
U.S. Cl. 165—166 9 Claims



8. A heat exchange core comprising

a plurality of frames formed from a corrugated cardboard material having a plurality of flow paths,

a plastic film secured to one side of said frame to form a heat transfer surface on one side of said frame,

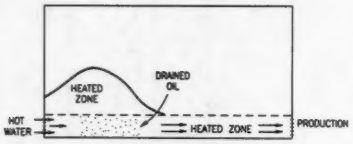
said frames being stacked so that each alternate frame is turned 90° with respect to each adjacent frame,

whereby the air paths of each alternate frame form a first flow path in one direction through said core and the air paths in the alternate frames form a second air path in the other direction through said core.

4,874,043
METHOD OF PRODUCING VISCOUS OIL FROM SUBTERRANEAN FORMATIONS

Earl M. Joseph; Robert J. Pritchard, and Arshad H. Sufi, all of Tulsa, Okla., assignors to Amoco Corporation, Chicago, Ill.

Filed Sep. 19, 1988, Ser. No. 246,223
Int. Cl.[4] E21B *43/24*
U.S. Cl. 166—272 5 Claims



HOT WATER

1. A method for producing viscous oil from a subterranean formation penetrated by an injection well and a spaced apart production well, said method comprising the steps of:
(a) establishing fluid flow communication between the injection well and the production well in a flow path along lower portions of a formation pay zone containing said viscous oil;
(b) heating the flow path and adjacent portions of the pay zone by injecting hot water or low quality steam into and through the flow path for a time sufficient to raise the temperature of the adjacent pay zone and viscous oil to a temperature at least sufficient to liquify the viscous oil and make it mobile in the heated zone and displaceable by hot water;
(c) injecting alternating slugs of hot water and steam through the injection well and into the pay zone overlying the heated flow path to cause the viscous oil in the pay zone to liquify and drain into the heated flow path and to be displaced toward the production well by hot water;
(d) subsequent to step (c), displacing substantially all of the oil in the heated path by hot water; and
(e) recovering produced fluids through the production well.

4,874,044
METHOD FOR OIL RECOVERY USING A MODIFIED HETEROPOLYSACCHARIDE

Peter D. Robison, Poughkeepsie, and Arthur J. Stipanovic, Wappingers Falls, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Oct. 11, 1988, Ser. No. 256,014
Int. Cl.[4] C08B *37/00*; C12P *19/04*; E21B *43/22*
U.S. Cl. 166—275 4 Claims

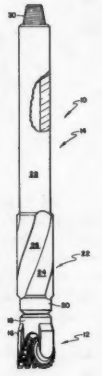
1. A process for recovering hydrocarbons from a subterranean hydrocarbon bearing formation penetrated by an injection well and a production well which comprises:
(a) injecting into the formation via said injection well an aqueous drive fluid comprising water and more than 50 ppm of a beta-fluoropyruvate modified NW11 heteropolysaccharide;
(b) forcing said aqueous drive fluid through the formation and
(c) recovering hydrocarbons from said production well.

2. A process for producing a heteropolysaccharide comprising:
(a) inoculating Xanthobacter sp. strain NW11-ATCC 53272 into an aqueous fermentation medium containing a carbon and nitrogen source;
(b) adding from 0.3 to 3.0 mM beta-fluoropyruvate to the fermentation after 0 to 24 hours;
(c) incubating said inoculated material at a temperature ranging from 26° to 30° C. for a period of about 120 to about 170 hours to form a heteropolysaccharide and
(d) recovering the polysaccharide.

4,874,045
STRAIGHT HOLE DRILLING METHOD AND ASSEMBLY

Charles H. Clayton, 202 Pecos, Portland, Tex. 78374

Filed Dec. 27, 1988, Ser. No. 290,578
Int. Cl.[4] E21B *7/00, 17/22*
U.S. Cl. 175—57 20 Claims



1. A method of drilling a well comprising
matching a particular bit with a particular stabilizer including
measuring a first maximum outer diameter of a bit;
selecting a stabilizer having a maximum outer diameter; and
machining the bit and removing material from the outer surface thereof to a second maximum diameter less than the first diameter and greater than the maximum outer diameter of the stabilizer.

5. A method of drilling a well comprising
drilling a bore hole in the earth to a depth and determining the angle of departure of the bore hole relative to a vertical axis;
reducing the angle of departure of the bore hole relative to the vertical axis including
matching a particular bit with a particular stabilizer including
measuring a maximum outer diameter of a bit;
selecting a stabilizer having an outer surface providing a first maximum outer diameter; and
machining the stabilizer and removing material from the outer surface thereof to a second maximum diameter less than the first diameter and less than the maximum outer diameter of the bit; and
drilling a continuation of the bore hole with the matched bit and stabilizer.

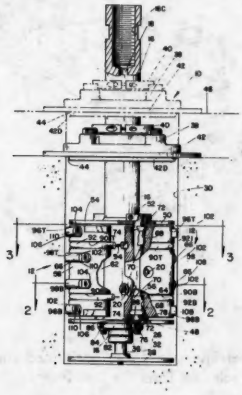
4,874,046
GROOVE CUTTER FOR CONCRETE BORES

Marvin G. Hurd, 105 Field St., Lakewood, Colo. 80226

Filed Apr. 1, 1988, Ser. No. 177,357
Int. Cl.[4] E21B *10/32*
U.S. Cl. 175—292 5 Claims

1. In a rotary groove-cutting tool of the type having a rotatable center shaft and two or more generally-arcuate flyweight subassemblies mounted for rotational movement with said center shaft, said subassemblies each being mounted for pivotal movement between a retracted inoperative position when at rest and an extended operative one upon being rotated, and in

which said flyweight subassemblies in extended position swing out toward the bore wall about eccentrically-located axes paralleling the center shaft but displaced radially therefrom, the improvement comprising a means carried by said flyweight subassemblies especially adapted for cutting circumferential



grooves in concrete bores likely to have voids therein, which comprises: at least two circumferentially elongate cutters having outwardly-facing abrasive cutting surfaces arranged one above the other in vertically-spaced stacked relation for cutting separate grooves, said cutters being circumferentially staggered while having portions thereof overlapped.

4,874,047

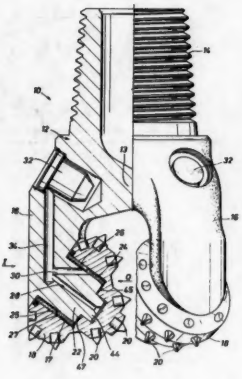
METHOD AND APPARATUS FOR RETAINING ROLLER CONE OF DRILL BIT

Charles E. Hixon, Houston, Tex., assignor to Cummins Engine Company, Inc., Columbus, Ind.

Filed Jul. 21, 1988, Ser. No. 222,139

Int. Cl.[4] E21B *10/20, 10/22;* B21K *5/02*

U.S. Cl. 175—369 **20 Claims**



1. A roller cone type rock bit comprising:

a bit body including at least one depending leg, said leg having an outer free end and an inner end continuous with the remainder of said bit body;

a roller cone having an axial internal hollow disposed in generally coaxially surrounding relation to said leg adjacent said outer end and sized to define an annular space therebetween;

and a plurality of separately pre-formed retention members mounted in said annular space, a first of said retention members being mounted on said leg by an interference fit and rotatable relative to said cone, and a second of said retention members—disposed longitudinally inwardly of said first retention member along said leg—being fixedly mounted on said cone and rotatable relative to said leg, and said retention embers having means cooperative therebetween to prevent relative movement of said second retention member longitudinally past said first retention member.

17. A method of rotatably mounting a cone member for a roller cone type rock bit on a depending leg member of a bit body, wherein said leg member has cylindrical outer wall means with a first end which is free and a second end which is continuous with the remainder of said bit body, and said cone member has an axial internal hollow having cylindrical inner wall means with a first end adjacent the base of said cone and at which said hollow opens through said cone, and a second end adjacent the apex of said cone and which is closed, said method comprising the steps of:

placing first retention means adjacent the second end of the respective wall means of one of said members, and in relatively rotatable relation thereto, with said first retention means extending radially beyond the respective wall means to form a first axially facing shoulder;

then affixing second retention means to said one member adjacent the first end of its respective wall means, with said second retention means also extending radially beyond the respective wall means to form a second axially facing shoulder facing in a direction opposite to said first shoulder;

then telescoping said members so as to place said inner wall means in coaxially surrounding relation to said outer wall means and the other of said members in relatively rotatable relation to said second retention means;

and affixing said other of said members to said first retention means.

4,874,048

LOADING AND WEIGHING STRUCTURE FOR COMBINATION WEIGHING MACHINE

Shozo Kawanishi, Kobe, and Tadashi Higuchi, Akashi, both of Japan, assignors to Yamato Scale Company, Limited, Akashi, Japan

Filed May 4, 1987, Ser. No. 46,833

Claims priority, application Japan, May 21, 1986, 61-77470[U]

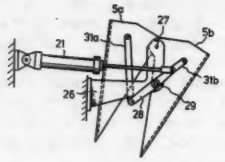
The portion of the term of this patent subsequent to May 6, 2097, has been disclaimed.

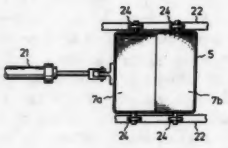
Int. Cl.[4] G01G *13/00, 13/16*

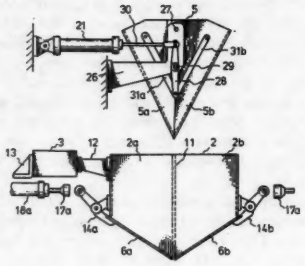
U.S. Cl. 177—25.18 **3 Claims**

1. A product feeding and weighing structure for a combination weighing machine, comprising a weigh hopper having a partition therein dividing the hopper into two chambers, a feed hopper disposed above the weigh hopper having discharge gate means adapted for opening to feed the contents of the feed hopper into either of the two chambers of the weigh hopper, and means for selectively effecting substantially linear horizontal movement of the feed hopper in one direction with respect to said partition for feeding the contents of the feed hopper through said discharge gate means into one chamber of the

weighing hopper and in the opposite direction with respect to the partition for feeding the contents of the feed hopper







through said discharge gate means into the other chamber of the weighing hopper.

4,874,049

AUTOMATIC WEIGHING METHOD AND APPARATUS

Howard Kee, Palermo, and Frederick Goff, Marysville, both of Calif., assignors to Kee Equipment and Engineering, Oakland, Calif.

Filed Feb. 3, 1989, Ser. No. 306,814

Int. Cl.[4] G01G *13/16, 13/24, 13/02*

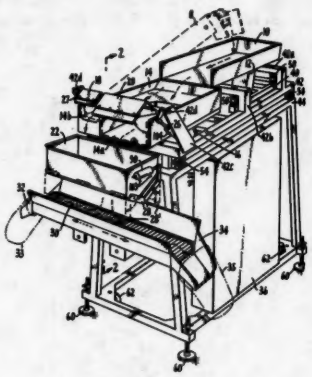
U.S. Cl. 177—59 **23 Claims**

1. An apparatus for weighing material, including:

a first gated bin for receiving and accumulating portions of the material, and including a means for releasing the material accumulated therein;

a first weighing hopper, positioned for receiving and accumulating the material released from the first gated bin, and including a means for releasing the material accumulated therein;

a first weight sensor coupled to the first hopper, for generating a weight signal indicative of the weight of material in the first hopper; and



a first reversible conveyor, positioned for receiving the material released from the first hopper.

4,874,050

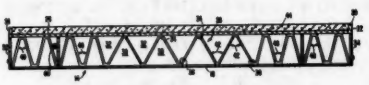
PORTABLE DECK TRUCK SCALE

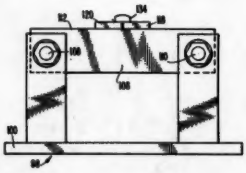
Thomas F. Strasser, and Herbert L. Stott, both of Meridian, Miss., assignors to Fairbanks Inc., Kans.

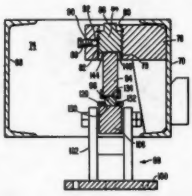
Filed Nov. 15, 1988, Ser. No. 271,992

Int. Cl.[4] G01G *19/02, 21/22*

U.S. Cl. 177—134 **18 Claims**







1. A portable deck truck scale comprising a scale deck including at least one deck section, said deck section having first

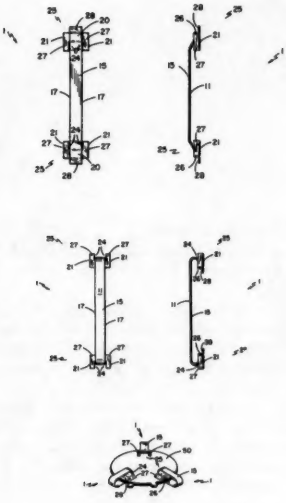
and second spaced sidewalls extending between spaced end walls and including a top deck assembly, bottom plate means spaced from said top deck assembly and a metal support means positioned between and joined to said top deck assembly and bottom plate means, said metal support means including "V"-shaped support beams extending longitudinally of said deck section between said spaced end walls substantially across the extent of said deck section between said first and second sidewalls, each said "V"-shaped support beam having an apex which is joined to either said top deck assembly or said bottom plate means and beam sidewalls which extend angularly away from said apex to form an apex angle at said apex, the apex angle of a plurality of said support beams adjacent to each of said first and second spaced sidewalls being less than the apex angle of the remaining support beams, load cell means mounted beneath said scale deck, and load transmitting means extending between said scale deck and said load cell means to transmit forces from said scale deck to said load cell means.

4,874,051

LEAF SPRING

John S. Borchard, 97-A Lowell Ave., Newton, Mass. 02160

Filed Feb. 13, 1989, Ser. No. 309,184
Int. Cl.[4] G01G *3/08;* F16F *1/18, 1/20*
U.S. Cl. 177—229 **7 Claims**



1. A leaf spring used in measuring apparatus for masses and forces, comprised of:

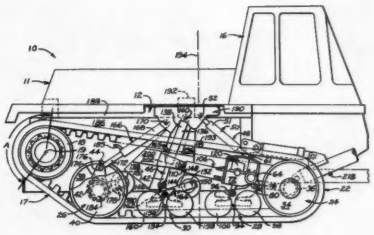
a flat, thin strip formed into an elongated flexible member terminating at either end into polygonal shapes with an overall width greater than the width of the elongated member, wherein each polygonal shape has four or more edges and is formed into a spring footing having three or more downwardly bent sides with one or more sides having outward flanges formed near their edges.

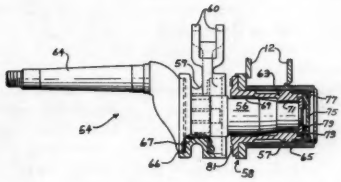
4,874,052

SUSPENSION SYSTEM FOR A VEHICLE

Robert J. Purcell, Washington, and Robert R. Farris, Peoria, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Dec. 23, 1987, Ser. No. 137,273
Int. Cl.[4] B60G *5/06, 13/06;* B62D *55/14*
U.S. Cl. 180—9.1 **16 Claims**





1. A recoil support assembly for and idler wheel of a vehicle having a frame, comprising:

recoil means for pivotally supporting the idler wheel with respect to the frame and resiliently reacting primarily to substantially horizontal forces applied to said idler wheel, said recoil means including a hydropneumatic recoil strut having a first portion connected to the frame and a second portion connected to the idler wheel, said recoil means further including a lever arm unit having a first shaft portion, a second shaft portion and an intermediate portion having ears, said lever arm unit being pivotally mounted to said frame by said first shaft portion; and

suspension strut means for pivotally supporting the second portion of said recoil means and said idler wheel on said frame and resiliently reacting primarily to substantially vertical forces applied to said wheel, said strut means including a hydropneumatic suspension strut having a first end connected to said vehicle frame and a second end connected to said ears on said intermediate portion of said lever arm unit.

4,874,053

TORQUE DETECTING APPARATUS

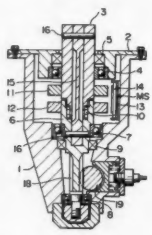
Hiroshi Kimura; Shotaro Naito, both of Katsuta; Kunio Miyashita, Hitachi; Yasuo Noto, Katsuta; Noboru Sugiura, Mito; Tadashi Takahashi, Hitachi; Hirohisa Yamamura, Hitachiota; Seizi Yamashita, Katsuta; Syoichi Kawamata, Hitachi; Fumio Tajima, Ibaraki, and Shigeru Horikoshi, Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 22, 1988, Ser. No. 209,998

Claims priority, application Japan, Jun. 22, 1987, 62-155061; Oct. 9, 1987, 62-253692; Oct. 9, 1987, 62-253693; Oct. 9, 1987, 62-253694; Oct. 21, 1987, 62-263930

Int. Cl.[4] B62D *5/04*

U.S. Cl. 180—79.1 **35 Claims**



1. A torque detecting apparatus comprising:

a driving shaft and a driven shaft connected coaxially with said driving shaft by a torsion bar;

a first drum fitted on said driving shaft and a second drum fitted on said driven shaft;

magnetic signals recorded on the surface of said first and second drums; and

a magnetic sensor for detecting the rotational angles of said first and second drums in a non-contact manner, said apparatus detecting a torque from a difference of rotational angles of said first and second drums, wherein said driving shaft and driven shaft are connected at free end portions thereof by a coupling bearing so that said shafts are allowed to have a relative rotation, and wherein said first and second drums are fitted on the external circumference of free ends of said driving shaft and driven shaft.

4,874,054

CONTROL IN A VEHICLE FOUR WHEEL STEERING SYSTEM

Kenichi Watanabe, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

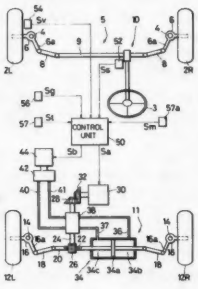
Filed Aug. 26, 1987, Ser. No. 89,552

Claims priority, application Japan, Aug. 27, 1986, 61-201085; Aug. 27, 1986, 61-201086; Aug. 27, 1986, 61-201087

Int. Cl.[4] B62D *5/06*

U.S. Cl. 180—140 **15 Claims**

1. A vehicle four wheel steering system including a manually actuated steering member, front wheel steering means for producing a steering angle in each of front wheels in response to an actuation of the steering member, rear wheel steering means for producing a steering angle in each of rear wheels in response to a steering movement of the front wheel, said rear wheel steering means including steering ratio setting means for determining a steering ratio of the steering angle of the rear wheel to the steering angle of the front wheel in accordance with a vehicle operating condition, the improvement comprising side force detecting means for detecting a side force produced in the vehicle in a transverse direction of the vehicle and producing a side force signal, steering ratio modifying means responsive to said side force signal for modifying the steering ratio so that the steering angle of the rear wheel is added with a modification steering angle in a direction opposite to the



direction of steering of the front wheel and the modification steering angle increasing as the side force increases.

4,874,055

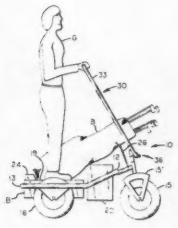
CHARIOT TYPE GOLF CART

Robin F. C. Beer, Seafield Ballymoney, Gorey, County Wexford, Ireland

Filed Dec. 16, 1987, Ser. No. 134,039

Int. Cl.[4] B62D *51/00*

U.S. Cl. 180—19.2 **4 Claims**



1. A golf cart comprising:

a frame having a front end and a rear end;

a platform mounted to said frame upon which a golfer may stand;

a pair of rear wheels mounted to said frame substantially straddling said platform, said wheels having a common axis oriented substantially perpendicular to a fore and aft cart center line which extends centrally through said platform;

a front wheel steerably mounted adjacent said frame front end along said cart center line said front and rear wheels being tangent to a cart operative support plane;

drive means for driving at least one of said rear wheels;

bag support means for supporting a golf bag in a designated space upon said platform; and

means for steering and supporting the cart for storage in an upended position and which includes a bar steerably coupled with said front wheel and having an elongated handle portion, oriented substantially parallel to said common axis of said rear wheels, said bar being adjustably mounted to locate said handle portion in a first position above said frame for gripping by a golfer standing upon said platform, a second position forwardly of said frame for gripping by a golfer walking beside said cart and a third position adjacent said frame rear end said handle portion and said frame rear end being coextensive in a cart storage

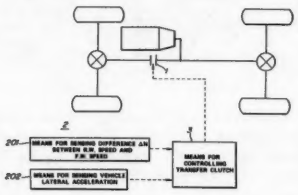
plane substantially perpendicular to said cart operative plane in said third position.

4,874,056

DRIVING FORCE DISTRIBUTION CONTROL SYSTEM FOR A 4 WHEEL DRIVE VEHICLE

Genpei Naito, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Dec. 2, 1987, Ser. No. 127,319
Claims priority, application Japan, Dec. 3, 1986, 61-288498
Int. Cl.[4] B60K *17/344*
U.S. Cl. 180—233 10 Claims


MEANS FOR SENSING DIFFERENCE ΔN BETWEEN R.W. SPEED AND F.W. SPEED
MEANS FOR SENSING VEHICLE LATERAL ACCELERATION
MEANS FOR CONTROLLING TRANSFER CLUTCH

1. A driving force distribution control system for a vehicle having a prime mover, primary driving wheels and secondary driving wheels, said control system comprisingly:

a transfer mechanism for transmitting a driving torque from said prime mover to said primary and secondary driving wheels, said transfer mechanism comprising a transfer clutch which is disposed in a drive path to said secondary wheels and capable of varying a clutch engagement force to vary a secondary drive torque transmitted through said transfer clutch to said secondary driving wheels,

actuating means for actuating said transfer clutch to vary a driving torque distribution between said primary and secondary wheels by varying said clutch engagement force of said transfer clutch in response to a control signal,

wheel speed difference sensing means for sensing a wheel speed difference between a revolving speed of said primary wheels and a revolving speed of said secondary wheels,

lateral acceleration sensing means for sensing a lateral acceleration of said vehicle, and

control means, connected to said wheel speed difference sensing means and said lateral acceleration sensing means, for producing said control signal and for increasing said clutch engagement force more gradually as said wheel speed difference increases when said lateral acceleration is high than when said lateral acceleration is low, said control means further comprising:

signal producing means for increasing said clutch engagement force of said transfer clutch so as to increase a tendency to a four wheel drive condition with an increase of said wheel speed difference by producing said control signal representing said clutch engagement force in accordance with a control characteristic between said clutch engagement force and said wheel speed difference, and

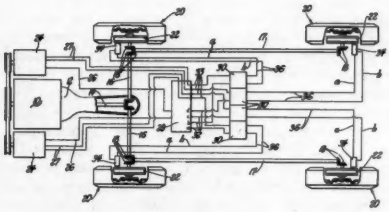
characteristic determining means for varying said control characteristic in accordance with said lateral acceleration so that a rate of increase of said clutch engagement force with respect to said wheel speed difference is increased, at least within a limited range of said wheel speed difference, when said lateral acceleration decreases, said characteristic determining means comprising selection means for selecting a predetermined gradual relationship as said control characteristic at least when said lateral acceleration is equal to a predetermined high value, and a predetermined steep relationship at least when said lateral acceleration is equal to a predetermined low value lower than said high value, said gradual and steep relationships being relationships between said clutch engagement force and said wheel speed difference determined so that, for any given value of said wheel speed difference, said clutch engagement force of said steep relationship is equal to or greater than that of said gradual relationship.

4,874,057

HYDROMECHANICAL ALL WHEEL DRIVE

Roger M. Smith, 7261 Lyons, Imlay City, Mich. 48444

Filed Mar. 29, 1988, Ser. No. 174,926
Int. Cl.[4] B60K *17/356*
U.S. Cl. 180—242 5 Claims



1. A wheel traction sensor for a vehicle wherein the vehicle has a right side and a left side, at least two wheels on each side, each wheel on the left side being parallel with and axially aligned with a corresponding wheel on the right side, the vehicle further having both mechanical and hydraulic drive inputs to each wheel, the hydraulic drive inputs including a hydraulic pump/motor attached to each wheel, the pump/motors having an output pressure corresponding to the rotational speed of the wheel; the sum of the output pressures on the right side corresponding to the sum of the rotational speeds of the wheels on the right side; the sum of the output pressures on the left side corresponding to the sum of the rotational speeds of the wheels on the left side; the wheel traction sensor comprising:

a left row of cylinders equal in number to the pairs of parallel wheels, each cylinder in the left row of cylinders communicating with the output pressure from a pump/motor on the left side;

a right row of cylinders equal in number to the pairs of parallel wheels, each cylinder in the right row of cylinders communicating with the output pressure from a pump/motor on the right side;

a piston disposed within each cylinder;

a first means for simultaneously moving the pistons in the right row of cylinders along equidistant parallel paths;

a second means for simultaneously moving the pistons in the left row of cylinders along equidistant parallel paths;

the output pressures from the wheels on the left side actuates the pistons in the left row of cylinders, and causes the first moving means to move a first distance corresponding to the sum of the rotational speeds of the wheels left side;

the output pressures from the wheels on the right side actuates the pistons in the right row of cylinders, and causes the second moving means to move a second distance corresponding to the sum of the rotational speeds of the wheels right side;

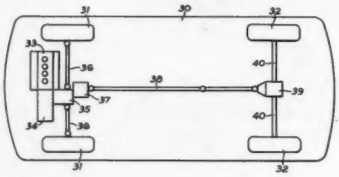
the difference between the first distance and the second distance corresponding to the difference in traction between the wheels on left side and right side of the vehicle.

4,874,058

VISCOUS SHEAR COUPLING

Georg Kwoka, Siegburg, Fed. Rep. of Germany, assignor to Viscodrive GmbH

Filed Jul. 21, 1988, Ser. No. 222,276
Int. Cl.[4] B60K *17/348*; F16D *31/06*
U.S. Cl. 180—248 20 Claims



16. A motor vehicle including a prime mover and a drive transmission having front and rear pairs of drivable wheels wherein, when the vehicle is being driven, the wheels of the front pair are driven directly and permanently from the prime mover via an inter wheel differential gear and the wheels of the rear pair are connected to the prime mover via viscous shear coupling means comprising at least one viscous shear coupling including a housing part; a hub part within the housing part, the parts being relatively rotatable about a common axis; a viscous liquid in the housing part; first and second sets of annular plate in the housing part, the plates of the first set being rotationally fast with the housing part and being interleaved with the plates of the second set which are rotationally fast with the hub part; pump means for the viscous liquid and communicating with the interior of the housing part and means connecting the pump means to the said parts so that the pump means is operated when there is relative rotation between said parts such that the pump means tends to fill the portion of the housing part containing the plates with the viscous liquid when the housing part and the hub part rotate relative to one another in one sense and tends to empty said portion of viscous liquid when said parts rotate relative to one another in the opposite sense; the viscous shear coupling means being arranged so that if one or both of the rear wheels overrun both of the front wheels, the pump means of the viscous shear coupling connected to the overrunning wheel or wheels tends to empty said portion of the housing part containing the plates in the or each such coupling to reduce the torque transmitted by the or each such viscous shear coupling, and said pump means is a screw pump.

4,874,059

CONTROL DEVICE FOR DIFFERENTIAL LIMITING MECHANISMS OF FOUR-WHEEL DRIVE CAR

Norimichi Kasegawa, Susono, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Jun. 1, 1988, Ser. No. 200,924
Claims priority, application Japan, Jun. 26, 1987, 62-157839
Int. Cl.[4] B60R *17/34*
U.S. Cl. 180—249 7 Claims

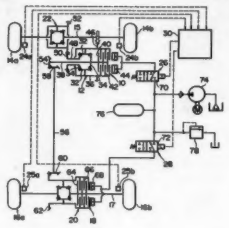
1. A control device for controlling differential limiting mechanisms of a full time four-wheel drive car provided with a central differential gear having a first differential limiting mechanism, a differential gear having a second differential limiting mechanism incorporated in one of a drive shaft connected with front wheels and a drive shaft connected with rear wheels and a differential gear incorporated in the other of said drive shafts, comprising:

means for detecting the rotational frequencies of left and right front wheels and left and right rear wheels;

means for operating said respective differential limiting mechanisms; and

a controller for receiving signals from said rotational frequency detecting means,

wherein said controller controls said respective operating means such that the differential motion between the front and rear wheels is greatly limited by said first differential limiting mechanism when a difference between the rotational frequencies of the front and rear wheels is equal to or larger than a first predetermined value and differential



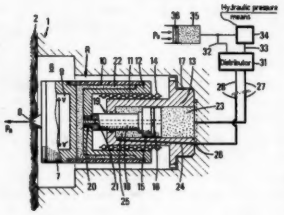
motion between the right and left wheels is greatly limited by said second differential limiting mechanism when a difference between the rotational frequencies of the left and right wheels is equal to or larger than a second predetermined value.

4,874,060

DEVICE FOR RECEIVING SOUND WAVES IN A WELL

Philippe Guerendel, Paris; Charles Naville, Massy; Jean Laurent, Orgeval, and Pascal Dedole, Rueil Malmaison, all of France, assignors to Institut Francais du Petrole & Compagnie Generale de Geophysique, Rueil-Malmaison, France

Continuation of Ser. No. 706,874, Feb. 28, 1985, abandoned.
This application May 7, 1987, Ser. No. 46,644
Claims priority, application France, Feb. 28, 1984, 85 03197
Int. Cl.[4] G01V *1/00, 1/40*
U.S. Cl. 181—102 18 Claims



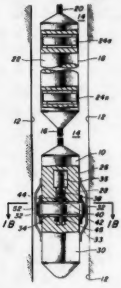
1. A sound wave reception device to be positioned in a probe lowered into a borehole at an end of a cable, said probe having a cavity and being provided with at least one anchoring movable arm, opening of said at least one arm pushing the probe towards a wall of the borehole, said device comprising at least one directional receiver assembly displaceable in said probe cavity and an actuating jack associated with pressure means for moving the at least one receiver assembly in said cavity along an axis of said jack between a retracted position away from a wall of the borehole and a position in which the at least one assembly is coupled with said wall of the borehole, and resilient suspension means, interposed between the actuating jack and said at least one receiving assembly, for resiliently suspending said at least one receiver assembly; said at least one receiver assembly being suspended by said suspension means and permitted by deformation of the suspension means to oscillate along a direction substantially perpendicular to the axis of said jack; whereby vibrations from the probe to the at least one receiver assembly are damped at least along a direction substantially perpendicular to the axis of said jack.

4,874,061

DOWNHOLE ORBITAL SEISMIC SOURCE

Jack H. Cole, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Filed Jan. 19, 1988, Ser. No. 145,019
Int. Cl.[4] G01V 1/40
U.S. Cl. 181—106 15 Claims



1. A downhole seismic source for the simultaneous generation of elliptically polarized shear wave seismic energy and compression wave seismic energy into a fluid-filled borehole wall comprising:

an elongated cylindrical frame means immersible in said fluid-filled borehole, said frame means having a central axis and first and second ends and an outer wall supportable at a point along said borehole wall;

means including a cable connected to said cylindrical frame means first end for supporting the frame means at selected positions along said borehole; and

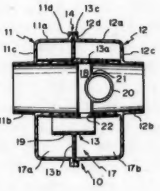
drive means disposed in said frame means in approximately equal spacing from the first and second ends and energizable to impart an eccentric orbital motion to at least a circumferal portion of the frame means outer wall thereby to generate an elliptically polarized shear wave in said borehole wall.

4,874,062

MUFFLER

Kouichi Yanagida, Toyota; Shinichiro Kano, Kariya; Takeshi Gotou, and Takashi Hirose, both of Aichi, all of Japan, assignors to Kojima Press Industry Co., Ltd., Aichi, Japan

Filed Sep. 6, 1988, Ser. No. 240,935
Claims priority, application Japan, Sep. 7, 1987, 62-136589[U]
Int. Cl.[4] F01N 1/02
U.S. Cl. 181—250 20 Claims



1. A muffler, comprising:

a pipe having a tubular wall;

a casing attached to an outer face of said tubular wall, and said casing covering a predetermined region of said outer face of said tubular wall to define a resonance chamber therein;

a wall member in contact with said outer face of said tubular wall and extending essentially over the entire region of said outer face of said tubular wall;

at least one separating wall connected to said wall member at one end thereof an connected to an inner wall of said casing, which faces said wall member, at another end thereof, to divide said resonance chamber into at least two resonance chamber portions; and

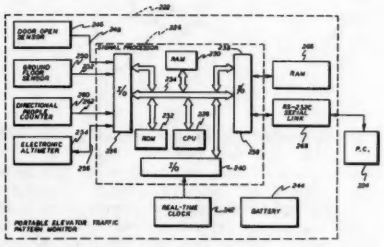
communicating means for communicating an interior of said pipe with said resonance chamber portions, said communicating means having at least one opening means extending through both said tubular wall and said wall member.

4,874,063

PORTABLE ELEVATOR TRAFFIC PATTERN MONITORING SYSTEM

Kenneth D. Taylor, South Windsor, Conn., assignor to Otis Elevator Company, Farmington, Conn.

Filed Oct. 27, 1988, Ser. No. 263,676
Int. Cl.[4] B66B 3/00
U.S. Cl. 187—130 4 Claims



1. Apparatus for an elevator, comprising:

a portable housing for mounting therein a plurality of components, said plurality comprising:

person sensing means, responsive to the presence of a person, for providing a person signal indicative of a direction of movement of said person;

height sensing means, responsive to the altitude of said portable housing for providing a floor signal;

clock means for providing a time signal indicative of the time of day; and

signal processing means, responsive to said person signal, said floor signal and said time signal for storing said person, floor and time signals.

4,874,064

BRAKE APPARATUS FOR AUTOMOTIVE VEHICLE

Toshio Ono, Okazaki, Japan, assignor to Aisin Takaoka Limited, Toyota, Japan

Filed Jun. 17, 1987, Ser. No. 63,240
Claims priority, application Japan, Jun. 25, 1986, 61-148893
Int. Cl.[4] F16D 55/02
U.S. Cl. 188—70 R 12 Claims

1. A brake apparatus for an automotive vehicle comprising:

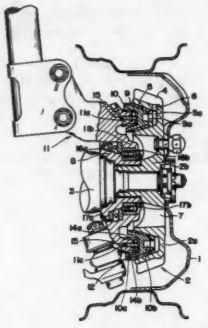
a wheel hub mounted for rotation about an axis of rotation and having inner and outer axial ends, said wheel hub including a rotary disk and a hub body, said rotary disk being provided with an annular V groove in a side thereof facing the inner axial end, said groove being concentric with said axis of rotation;

a separate and discrete bearing support member abutting said hub body and having an outer circumferential surface and a flange portion extending radially outwardly of said hub body at said inner axial end of said wheel hub;

a steering knuckle mounted adjacent said inner axial end of said wheel hub and being provided with an annular por-

tion which is concentric with said axis of rotation and which extends axially of and radially outwardly of said bearing support member, said annular portion having an inner circumferential surface and including a projection extending radially inwardly of said annular portion at an axial position intermediate said inner and outer axial ends of said wheel hub;

a V-shaped brake member mounted on said steering knuckle and being engageable and disengageable with said V-



groove through movement in a direction parallel with said axis of rotation of the wheel hub; and

bearing means for radially and axially supporting the wheel hub relative to said steering knuckle, said bearing means being disposed between said outer circumferential surface of said bearing support member and the inner circumferential surface of the annular portion of the steering knuckle, and being axially secured between said projection and said flange portion.

4,874,065

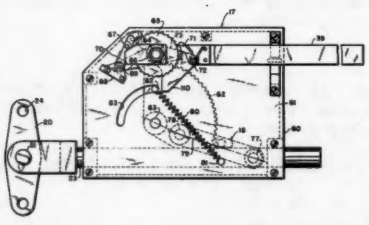
PARKING BRAKE SYSTEM FOR RAILWAY VEHICLES

Thomas H. Engle, Clayton, N.Y., assignor to General Signal Corporation, Stamford, Conn.

Division of Ser. No. 932,418, Nov. 19, 1986, Pat. No. 4,746,171. This application Feb. 26, 1988, Ser. No. 160,900

Int. Cl.[4] F16D *65/30*

U.S. Cl. 188—265 **7 Claims**



1. A manual handbrake mechanism adapted to selectively govern utilization of a spring handbrake cylinder to control brakes of a brake rigging comprising;

(a) a handbrake mechanism housing,

(b) a handbrake rod journalled in the housing for axial movement to first and second axially operated positions,

(c) locking means in the housing for selectively limiting axial movement of the handbrake rod in a particular direction,

(d) a manual handbrake handle for selectively governing the locking means, and

(e) the locking means being in the form of a toggle that is normally in a reset locking position restraining the handbrake rod against axial movement in a particular direction.

4,874,066

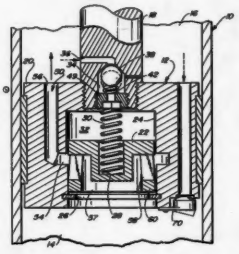
VARIABLE FLOW SHOCK ABSORBER AND METHOD

Ilan Silberstein, Tiburon, Calif., assignor to S.U.I. Corporation, Tiburon, Calif.

Continuation of Ser. No. 128,588, Dec. 4, 1987. This application Feb. 14, 1989, Ser. No. 311,082

Int. Cl.[4] F16E *9/34*

U.S. Cl. 188—280 **9 Claims**



1. A shock absorber comprising, in combination:

a cylinder having an interior with fluid therein;

a piston rod;

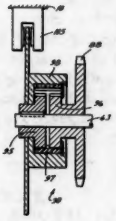
a piston mounted within said cylinder interior defining first and second chambers in said cylinder and a primary passageway permitting the flow of fluid from said first chamber into said second chamber as fluid is pressurized in said first chamber by movement of said piston, said piston including relatively moveable first and second piston elements defining a variable-sized, fluid-filled space in continuous communication with said second chamber through a fluid-flow restricting vent spaced from said primary passageway, formed in said shock absorber, and providing communication between said space and said second chamber, said first piston element being fixedly mounted relative to said piston rod, movable with said piston rod, and defining a recess, and said second piston element having a peripheral wall at least partially disposed within said recess and said second piston element being gradually displaceable relative to said first piston element toward said piston rod within said recess responsive to pressurization of fluid in said first chamber to force the fluid in said space through said fluid-flow restricting vent and into said second chamber whereby the size of said space is gradually reduced as a function of the amount of fluid forced through said fluid-flow restricting vent, said primary passageway including at least one flow path defined by said first piston element and communicating with said recess and at least one aperture defined by said second piston element in the peripheral wall thereof in communication with said flow path, relative movement of said piston elements gradually displacing said aperture relative to said flow path to gradually modify the effective size of said primary passageway in response to the gradual reduction of said space size caused by fluid pressure within said first chamber exceeding fluid pressure within said second chamber and fluid flowing through said fluid-flow restricting vent, said flow path including a groove defined by said first piston element about the periphery of said recess, said groove and said aperture being so configured as to be in continuous at least partial registry during gradual displacement of said aperture.

4,874,067

AUTOMATIC CHANGEOVER FOR CARTONERS

Joseph D. Greenwell, Florence, Ky., assignor to R. A. & Co. Inc. Jones, Covington, Ky.

Division of Ser. No. 928,526, Nov. 7, 1986, Pat. No. 4,718,540.
This application Nov. 3, 1987, Ser. No. 116,165
Int. Cl.[4] B60K *41/26*; B65G *15/20*
U.S. Cl. 192—4 R 4 Claims



1. In a cartoner having a frame, a main drive, and at least one operating element connected to said main drive to be driven in synchronism with said main drive, a mechanism for varying the position of said element with respect to a reference position on said main drive comprising,

a phase variator connected between said main drive and said element,

said phase variator having a housing, a driving gear, a driven gear and an intermediate gear interconnecting the driving and driven gears, all said gears normally having no relative rotation, thereby functioning as a rigid drive coupling,

said gears being rotatable with respect to said housing when said housing is blocked against rotation,

a brake fixed to said cartoner frame and engageable with said variator to block movement of the housing to force relative movement of the driving and driven gears, thereby causing said element to shift its relationship with respect to the said reference position,

a computer,

means connected to said computer for detecting the position of said element with respect to said reference position,

means for setting in said computer a desired position for said element,

and means for effecting release of said brake when said desired phase position is achieved.

4,874,068

CLUTCH AND BRAKE RAPID EXHAUST MANIFOLD

Marcus H. Collins, Akron, and Ronald W. Diesch, Lodi, both of Ohio, assignors to Eaton Corporation, Cleveland, Ohio

Filed Jan. 19, 1988, Ser. No. 145,154
Int. Cl.[4] F16D *67/04*
U.S. Cl. 192—18 A 6 Claims

4. A spring operated brake and fluid operated clutch apparatus comprising;

a hub adapted to be rotatable with a driven input shaft;

a piston and cylinder means rotatable with said hub and forming a pressure chamber;

a rotor connected to said hub for rotation therewith;

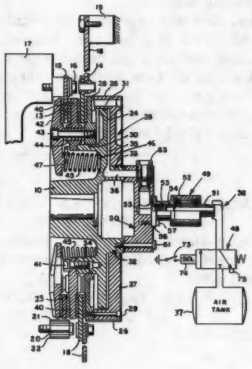
a rotatable clutch disc connectable to a rotatable output member;

a non-rotatable brake disc;

spring means biasing said brake disc and said rotor toward each other and said clutch disc and said rotor away from each other;

said pressure chamber adapted to be connected to a source of pressurized fluid, said pressure chamber when pressurized operatively connecting said rotor and said clutch disc against the bias of said spring means and disconnecting said rotor and said brake disc, said spring means operatively connecting said rotor and said brake disc and disconnecting said rotor and said clutch disc when said pressurized chamber is depressurized;

a fluid circuit for directing fluid between the source of pressurized fluid, said pressure chamber and the atmosphere, said fluid circuit comprising a manifold member having a centrally located main fluid passageway therein and a plurality of second passageways, each of which communicates at one end thereof with said main fluid passageway



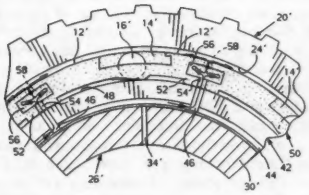
and at the opposite end thereof with said pressure chamber, a plurality of quick release valves, each of which is disposed in one of said plurality of second passageways and each of which includes an exhaust passageway therein for directing fluid from said pressure chamber, said main fluid passageway being in fluid communication with the source of pressurized fluid and valve means for disconnecting said source of pressurized fluid from said main fluid passageway and simultaneously exhausting the pressurized fluid in said main fluid passageway.

4,874,069

ROLLER CLUTCH WITH IMPROVED LUBRICATION

Frederick E. Lederman, Sandusky, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 31, 1988, Ser. No. 238,788
Int. Cl.[4] F16D *15/00*
U.S. Cl. 192—45 3 Claims



1. In a roller clutch of the type that has a cage that is installed to a cam race and which is located between said cam race and a pathway race with a bearing surface of said cage riding on a cylindrical surface of said pathway race, and in which said cam race is secured to a mounting structure and tightly abutted with a portion of said mounting structure so that said mounting structure and abutted cam race together create a primary closed oil path that ends at an edge of said

cam race, and in which pressurized oil is provided to said primary oil path as said clutch operates, an improved cage for said roller clutch, comprising,

an internal passage in said cage that is open through one face of said cage and which registers with said primary oil path at said cam race edge when said cage is installed to said cam race,

means maintaining said one cage face abutted with said mounting structure portion after said cam race has been secured to said mounting structure, and,

a port connecting said cage internal passage to said cage bearing surface,

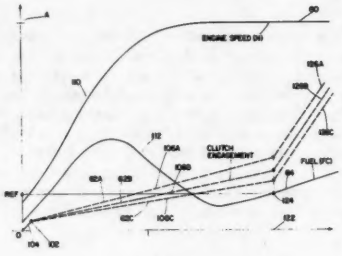
whereby, after said cage has been installed to said cam race and said cam race has been secured to said mounting structure, said cage and mounting structure together create a secondary closed oil path that connects to said primary oil path, so that pressurized oil may be supplied directly between said cage bearing surface and said pathway race cylindrical surface.

4,874,070

CONTROL FOR AMT SYSTEM START FROM STOP OPERATION

Richard A. Nellums, Astley Park, England, and Eugene R. Braun, Royal Oak, Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Feb. 10, 1988, Ser. No. 154,396
Int. Cl.[4] B60K *41/02*
U.S. Cl. 192—0.052 **31 Claims**



1. A method for controlling a vehicle start from stop system (10) for vehicles having an operator actuated throttle pedal (24), a fuel control (26) for controlling the amount of fuel supplied to a fuel controlled engine (14), a transmission (12) having a plurality of gear ratio combinations selectively engagable between a transmission input shaft and a transmission output shaft (20), said transmission input shaft being operatively connected to said engine by means of a selectively engagable and disengagable friction clutch (16), said start from stop system comprising an information processing unit (42) having means for receiving a plurality of input signals including an input (N) signal indicative of the rotational speed of the engine and an input signal (THL) indicative of the operator setting of the throttle pedal, said processing unit including means for processing said input signals in accordance with predetermined logic rules for determining a reference value (REF) equal to a predetermined percentage of maximum fuel supply to the engine and for generating command output signals whereby said system is operated in accordance with said logic rules, and means (26, 30, 34) associated with said system effective to actuate said transmission system in response to said command output signals from said processing unit;

said processing unit having means to sense vehicle start from stop operation and, in a vehicle start from stop operation, issuing command output signals to clutch control means (30) for controlling the rate of engagement of said clutch and to fuel control means (26) for controlling the amount of fuel (FC) supplied to said engine; the method characterized by:

setting a target engine speed value (A) as a function of the operator setting (THL) of the throttle pedal (138, 140);

modulating the amount of fuel supplied to the engine to cause the engine speed of rapidly, in a damped manner, substantially equal said target engine speed and then modulating the amount of fuel to said engine to cause said engine speed to be maintained at said target engine speed value (146, 148); and

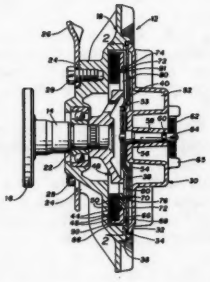
causing said clutch to engage at a first rate of engagement (106) until engine speed (N) has been caused to equal and be maintained at said target value (A) and the amount of fuel (FC) currently being supplied to the engine is equal to or greater than said reference value (REF), then causing said clutch to be engaged at a second (126) more rapid rate of engagement.

4,874,071

VISCOUS CLUTCH FOR ENGINE COOLING FAN

Charles R. White, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 12, 1988, Ser. No. 231,311
Int. Cl.[4] F16D *35/00, 43/25*
U.S. Cl. 192—58 B **4 Claims**

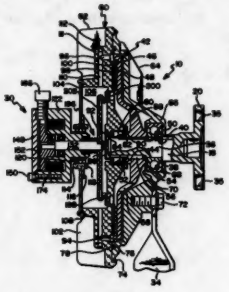


1. A bladed fan and hydraulic clutch assembly for inducing a flow of cooling air through a radiator in which engine coolant is circulated comprising an input shaft member adapted to be rotatably driven, clutch plate means rotatably driven by said shaft member, said clutch plate means having a plurality of axially extending and concentric lands, rotatable clutch body means axially spaced from said clutch plate means having a plurality of axially extending and concentric lands interleaved with said lands of said clutch plate means to form a fluid shear zone therebetween, a pump plate fixed to said clutch body means and encasing said clutch plate in said clutch body means, reservoir means for containing a quantity of viscous shear fluid for operating said clutch assembly, an outlet opening for said reservoir, control means for opening and closing said outlet opening, axially extending openings formed in the face of said clutch plate and extending to the concentric lands thereof, annular fluid seal ring means adjacent to said clutch plate openings and operatively interposed between said pump plate and said clutch plate to slidably contact said pump plate and block the flow of fluid outwardly therefrom and blocker arm means extending inwardly from said fluid seal ring means and directly into said axially extending openings for partially blocking a portion of said openings to restrict the flow of fluid therethrough to thereby control the engagement of said clutch, fan blade means extending from said clutch body means, said pump plate having pumping means associated therewith to pump fluid exiting from said shear zone back to said reservoir.

4,874,072
VISCOUS FAN DRIVE CONTROL WITH INTEGRATED SPEED SENSOR

Robert J. Mohan, Madison Heights, and Walter K. O'Neil, Birmingham, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Nov. 10, 1987, Ser. No. 119,133
Int. Cl.[4] F16D *35/00*
U.S. Cl. 192—58 B **18 Claims**



1. A viscous fluid clutch comprising:

first and second members mounted for relative rotation about a common axis and defining cooperating shear surfaces;

means operative to generate a flow of viscous fluid between said surfaces;

valving means operable to effect modulation of said flow and including an element carried by one of said members displaceable between a first limit of travel for minimum torque transmission and a second limit of travel for maximum torque transmission;

actuator means operative to selectively position said element between said limits of travel in response to an actuation signal, said actuator means including a substantially grounded thrust surface operative to frictionally engage said valving means to extract kinetic energy from said one of said members and input it to said valving means to move said valving means and thereby effect said modulation;

means operative to sense the rotational speed of said one of said members and to generate a speed signal as a function thereof, said speed sensing means comprising flag and sensor elements disposed in relative rotational alignment, one of said elements carried by said actuator means and the other of said elements carried by said one of said members; and

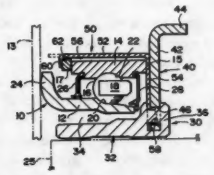
control means operative to generate said actuation signal as a function of said speed signal.

4,874,073
CLUTCH RELEASE BEARING DEVICE

Kenichi Tagawa, Fujisawa, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 21, 1988, Ser. No. 171,394
Claims priority, application Japan, Apr. 2, 1987, 61-79697
Int. Cl.[4] F16C *19/00*; F16D *23/14*
U.S. Cl. 192—98 **5 Claims**

1. A clutch release bearing device, comprising a clutch release bearing to be abutted against a diaphragm spring for a vehicle clutch, and bearing holding means, said bearing holding means including a synthetic resin sleeve fitted on a fixed guide, a hollow-disk shaped anvil extending radially outward from said sleeve for receiving a drive force from a fork and having a plurality of holes formed circumferentially along an inner periphery thereof, and a bearing case extending from said anvil and holding said clutch release bearing, said bearing case having a flange juxtaposed to said anvil and having an inner periphery provided with through-holes having circumferential walls protruding into the holes of said anvil and coupling said bearing case to said anvil by engagement with the peripheries

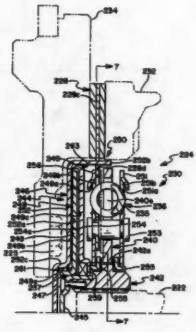


of said holes of said anvil, the inner peripheries of said flange and said anvil being disposed within the resin of said sleeve with the resin of said sleeve filled in said holes of said anvil such that said sleeve, said bearing case, and said anvil are integrally coupled with one another.

4,874,074
TORSIONAL VIBRATION DAMPING MECHANISM

Gerald D. Damon, Farmington, and David P. Godlew, Birmingham, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Aug. 20, 1987, Ser. No. 87,587
Int. Cl.[4] F16D *3/14*
U.S. Cl. 192—106.2 **4 Claims**



1. A torsional vibration damping mechanism adapted to be rotationally interposed in a driveline between an output drive of a prime mover and an input drive of a transmission having in-gear and neutral positions respectively connecting and disconnecting the input drive with a load; the mechanism comprising:

first and second assemblies disposed for relative rotation about a common axis, the first assembly including fist and second radially extending, axially spaced apart wall members secured together and adapted for selective driving connection to the prime mover drive via a friction ring, the second assembly being an annular hub member adapted to be sidably splined to the transmission input drive, and the wall members each including an inner peripheral portion journaled on the hub member;

an intermediate means including a radially extending member disposed between the first and second wall members and radially outward of the hub member, the member of the intermediate means including a plurality of internal spline teeth mating with a plurality of external spline teeth on the hub member, the mating teeth having a predetermined amount of circumferential free play therebetween;

a first spring set comprising a plurality helical compression springs of relatively high spring rate circumferentially spaced apart and resiliently interconnecting the wall members with the intermediate means member;

a second spring set comprising at least one idle rattle spring having a relatively low spring rate and resiliently disposed between the intermediate means member and the hub member for resiliently opposing the free play between the spline teeth; and

a viscous shear damper assembly including housing and clutch assemblies mounted for relative rotation and respectively connected to the first assembly and the hub member of the second assembly, the clutch assembly disposed in a chamber defined by the housing assembly and being in viscous shear clutching coaction in response to flexing of either of the spring sets.

4,874,075

SWITCH TRACK ASSEMBLY FOR HIGH-SPEED HANDLING OF ELECTRONIC COMPONENTS

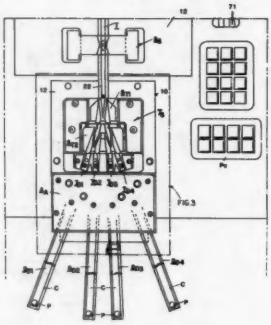
Frank V. Linker, and Frank V. Linker, Jr., both of Broomall, Pa., assignors to American Tech Manufacturing Corp., Erlanger, Ky.

Continuation of Ser. No. 49,437, May 14, 1987, abandoned, which is a continuation of Ser. No. 866,222, May 22, 1986, Pat. No. 4,705,152. This application Nov. 16, 1988, Ser. No. 273,108

The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.

Int. Cl.[4] B65G *11/20*

U.S. Cl. 193—39 **1 Claim**



1. A switch track mechanism for selectively directing electronic components moving along and straddling a trackway to at least two discharge or accumulator stations comprising a fixed track section being formed by the trackway, said fixed track section straddled by the electronic components, a movable track section operatively associated with said fixed track section and disposed on opposite sides thereof, said movable track section straddled by the electronic components and operable between first and second limit positions, at least two accumulator stations downstream of said track sections and means for actuating the movable track section between predetermined first and second limit positions whereby electronic components may be directed from the trackway to a select one of the accumulator stations, said fixed track sections having two opposed first contact surfaces and said movable track section having two opposed second contact surfaces, one of the second contact surfaces confronting and engageable with one of the first contact surfaces, determining said first limit position, the other second contact surface confronting and engageable with the other first contact surface, determining said second limit position, accurate registry of said fixed and movable track sections at said limit positions being determined solely be engagement of said confronting track sections.

4,874,076

DEVICE FOR TRANSFERRING PACKAGES

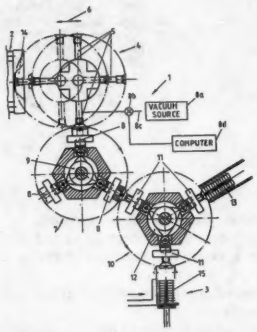
Horst Kaplan, and Gerhard Grube, both of Bielefeld, Fed. Rep. of Germany, assignors to Otto Hänsel GmbH, Hanover, Fed. Rep. of Germany

Continuation of Ser. No. 52,696, May 21, 1987, abandoned. This application Nov. 14, 1988, Ser. No. 273,174

Claims priority, application Fed. Rep. of Germany, May 22, 1986, 3617259

Int. Cl.[4] B65G *29/00*

U.S. Cl. 198—370 **10 Claims**



1. Apparatus for transferring package articles from an article packaging machine to a box-packing machine, comprising: storage means for storing a predetermined supply of said packaged articles in a supply shaft; transfer means for transferring packaged articles from said packaging machine directly to said box-packing machine; means for diverting defectively packaged articles away from said box-packing machine so that defectively packaged articles do not reach said box-packing machine; means for replacing the defectively packaged article directly with a packaged article from said supply shaft in said storage means without interrupting the flow of packaged articles to said box-packing machine; said transfer means transferring the packaged article from said supply shaft to said box-packing machine at a location in substantially close proximity to said box-packing machine for replacing said defectively packaged article, said packaging machine being substantially distant from said box-packing machine compared to the distance between said supply shaft and said box-packing machine; said transfer means having a gripper for picking up and advancing packaged articles leaving said article packaging machine; said supply shaft having an opening for the passage of articles to said supply shaft and from said supply shaft, said opening being positioned in a path of conveyance of said gripper.

4,874,077

DEVICE FOR TRANSFERRING A LITHOGRAPHIC PLATE

Akio Yaguchi, Hidaka, and Takatsugu Kyoo, Iruama, both of Japan, assignors to Tsubakimoto Chain Co., Japan

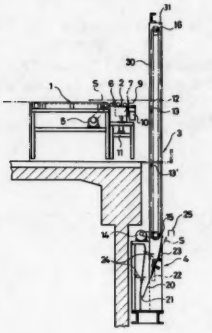
Filed Apr. 8, 1988, Ser. No. 180,443

Int. Cl.[4] B65G *15/00*

U.S. Cl. 198—408 **5 Claims**

1. A device for transferring a lithographic plate (S) from a horizontal conveyor (1) to an overhead conveyor (25), which device comprises elevating means (3) having a hook member (13) for engaging a folded end portion (12) of a lithographic

plate to raise the lithographic plate into a vertical position and then lower the lithographic plate onto a positioning bed (4) provided in the vicinity of the lower end of the elevating means, the elevating means moves in a path having a bottom portion defining a locus of points through which the hook member travels, the positioning bed having a pivotable portion



(23) for pivoting the lithographic plate deposited on the positioning bed, so that the folded end of the lithographic plate is positioned internally of the locus (B) of the hook member whereby the lithographic plate is separated from the hook member and upon movement of the pivotable portion of the positioning bed, the lithographic plate is transferred to the overhead conveyor.

4,874,078

PACKAGE HANDLING AND RE-ORIENTING APPARATUS, PARTICULARLY COMPRESSIVE PAPER ROLLS, SUCH AS TOILET PAPER, KITCHEN TOWELS, AND THE LIKE

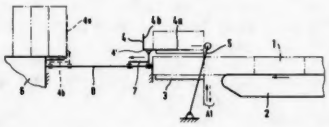
Dieter Meyer, Ludwigshafen, Fed. Rep. of Germany, assignor to Paper Converting Machine GmbH, Schifferstadt, Fed. Rep. of Germany

Filed Jun. 1, 1988, Ser. No. 201,575

Claims priority, application Fed. Rep. of Germany, Jun. 12, 1987, 3719574

Int. Cl.[4] B65G *47/24*

U.S. Cl. 198—409 **12 Claims**



1. Package handling and reorienting apparatus, particularly to receive rolls of compressible paper products, such as toilet paper, kitchen towels and the like, from a supply transport apparatus, (2,3) and turn the packages (1) by 90° to stand the packages on end for delivery to a removal apparatus (6),

said handling and re-orienting apparatus including

a generally L-shaped angled movable receiver (4) having two support surfaces (4*a*, 4*b*) defining a generally L-shaped structure, said support surfaces being joined at a corner of the L-shaped structure;

means for supporting said receiver to receive the packages at a starting position of the receiver on one (4*a*)of said support surfaces, the receiver with the packages thereon pivoting about 90°, and translating between the supply apparatus (2) and the removal apparatus (6), for delivering said products(1), turned 90°, to the removal apparatus, and the receiver moving in reverse pivoting and translatory movement to the starting position;

wherein said support means for the receiver includes a guide means (8) guiding translatory movement of the receiver from said starting position to the removal apparatus and

means for pivoting said receiver at a speed which is higher when the receiver moves from the removal apparatus towards said starting position than when the receiver moves from the starting position towards the removal apparatus, comprising

a reciprocally movable guide track (13), and an engagement means (14) coupled to and movable in the guide track and secured to the receiver; and

a moving means (15) coupled to the guide track (13) to reciprocally move the guide track into selectively different positions as the receiver (4) moves from the starting position towards the removal apparatus (6) and vice versa.

4,874,079

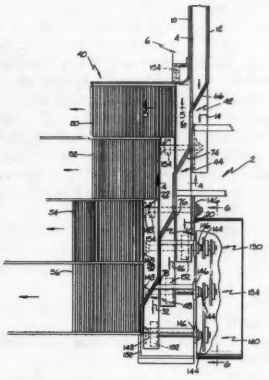
ARTICLE TRANSFERRING CONVEYING SYSTEM

Robert L. Frenkel, Englewood; Christopher S. Derks, and Donald L. Armstrong, both of Arvada, all of Colo., assignors to Adolph Coors Company, Golden, Colo.

Filed Feb. 8, 1988, Ser. No. 153,311

Int. Cl.[4] B65G *47/68*

U.S. Cl. 198—436 **14 Claims**



1. Apparatus for changing a single row of moving articles into a plurality of rows of moving articles comprising:

a first continuously moving conveyor having a first plurality of articles in a continuous stream supported on an upper surface thereof;

said plurality of articles comprising a single row of articles moving with said upper surface in a first linear direction;

at least a portion of each of said plurality of articles having a generally cylindrical outer surface adapted to contact the generally cylindrical outer surfaces of adjacent articles and each of said generally cylindrical outer surfaces having substantially the same diameter;

at least a second continuously moving conveyor moving in a second linear direction;

said first and second linear directions being parallel to each other;

at least a portion of said first continuously moving conveyor and at least a portion of said second continuously moving conveyor being in a side by side relationship;

said second continuously moving conveyor moving at a velocity which is less than the velocity of said first continuously moving conveyor;

at least a first fixedly mounted deflector means for succes-

sively contacting each of said articles on said first continuously moving conveyor to apply a force thereto and to guide the movement of said successive articles toward and onto said second continuously moving conveyor;

each of said generally cylindrical outer surfaces of said deflected articles being moved toward and onto said second continuously moving conveyor being in contacting relationship with the article in front of it and the article in back of it;

said first deflector means having a beginning portion and an ending portion;

at least one continuously moving collection conveyor moving in a third linear direction;

said third linear direction being substantially perpendicular to said first and second linear directions;

said at least a first deflector means and said slower moving second continuously moving conveyor cooperating to produce force applying means adjacent to said ending portion of said at least a first deflector means for applying a force to at least one article of said deflected articles to move said at least one deflected article over said second continuously moving conveyor and onto said continuously moving collection conveyor means at a first location and leaving at least another one of said deflected articles on said second continuously moving conveyor for movement therewith;

at least a second deflected article located between said first and second continuously moving conveyors and in contact with said at least one deflected article; and

said at least a second deflected article applying a pushing force to said at least one deflected article to ensure contact of said at least one deflected article with at least said second deflected article and a third deflected article on said second continuously moving conveyor means so that said at least a third deflected article applies a restraining force on said at least one deflected article so that the resultant of said pushing and restraining forces extends in a direction to move said at least one deflected article over said second continuously moving conveyor means and onto said continuously moving collection conveyor at said first location;

said second continuously moving conveyor having a second plurality of articles in a continuous stream supported on an upper surface thereof and moving therewith in a single row;

at least a third continuously moving conveyor moving in a fourth linear direction;

said second and fourth linear directions being parallel to each other;

at least a portion of said second continuously moving conveyor and at least a portion of said third continuously moving conveyor being in a side by side relationship;

said third continuously moving conveyor moving at a velocity which is less than the velocity of said second continuously moving conveyor;

at least a second fixedly mounted deflector means for successively contacting each of said second plurality of articles on said second continuously moving conveyor to apply a force thereto and to guide the movement of said successive articles toward and onto said third continuously moving conveyor;

each of said generally cylindrical outer surfaces of said deflected articles being moved toward and onto said third continuously moving conveyor being in contacting relationship with the article in front of it and the article in back of it;

said second deflector means having a beginning portion and an ending portion; and

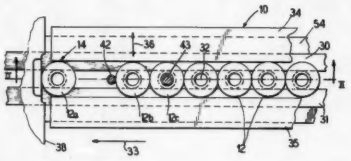
said at least a second deflector means and said slower continuously moving third conveyor cooperating to produce force applying means adjacent to said ending portion of said at least a second deflector means for applying a force to at least one article of said articles deflected by said second deflector means to move said at least one deflected article of said articles deflected by said at least a second deflector means over said third continuously moving conveyor and onto said continuously moving collection conveyor means at a second location spaced a distance from said first location and leaving at least another one of said deflected articles on said third continuously moving conveyor for movement therewith.

4,874,080

CONVEYOR

Lucien J. Wroblewski, 16 W. 171 Shore Ct., Hinsdale, Ill. 60521

Filed Jun. 10, 1988, Ser. No. 205,379
Int. Cl.[4] B65G *37/00*
U.S. Cl. 198—463.6 **19 Claims**



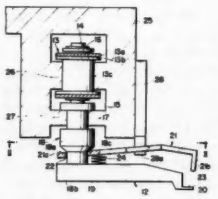
1. A device for conveying articles from an input end to an output end with a continuous orientation along a center line as a column of articles, said device comprising a main frame, at least one pair of continuous belts having contact surfaces, first means for mounting said pair of continuous belts in the main frame with an adjustable spacing therebetween relative to said center line, drive means for driving the belts at the continuous speed, second means for guiding articles being carried by said belts to move along the center line, said second means being adjustable relative to said belts and center line, said second means coacting with the first means to control the amount of conveying force being transferred between the pair of belts to each of said articles, third means for holding the articles in a single layer in said column on said pair of belts, fourth means for holding an article at the exit end in an exit position, and fifth means for releasing one article at a time from a leading end of the column of articles to be carried by the belts to said exit position while retaining the remaining articles of the column in a position spaced from said exit position.

4,874,081

DEVICE FOR TRANSFERRING PRINTED CIRCUIT BOARD

Kenshi Kondo, Tokyo, Japan, assignor to Nihon Den-Netsu Keiki Co., Ltd., Japan

Filed Nov. 2, 1988, Ser. No. 265,959
Claims priority, application Japan, Nov. 20, 1987, 62-291857
Int. Cl.[4] B65G *29/00*
U.S. Cl. 198—803.9 **7 Claims**



1. A device for transferring printed circuit boards, comprising:

a pair of spaced apart, endless roller chains each guided by a

guide rail to define a printed circuit board transferring path therebetween;

a plurality of support members fixed to said chains for movement therewith and each adapted to support thereon a side edge portion of a printed circuit board, so that the printed circuit board can be transferred along said path with opposite side edge portions thereof being supported on the support members;

a clamp plate member pivotally mounted on each of said support members and adapted to move between a close position where said clamp plate member is engageable with an upper surface of the side edge portion of the printed circuit board supported on the support members and an open position where said clamp plate member is incapable of engaging with the printed circuit board;

means provided on each of said support members for urging the corresponding clamp plate member to rotate so that the clamp plate member is normally maintained in the open position; and

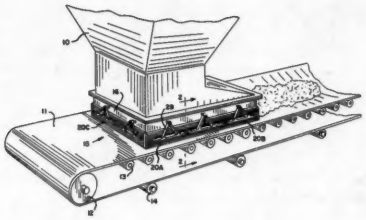
engaging plates fixed to each of said guide rails and having a lower surface engageable with upper surfaces of the clamp plate members to maintain the clamp plate members in the close positions, whereby the printed circuit board supported on the supporting members is clamped between the supporting members and the clamp plate members during the engagement of the clamp plate members with the engaging plates.

4,874,082

CONVEYOR SKIRT BOARD, CLAMP AND MOUNTING ARRANGEMENT

Robert T. Swinderman, Kewanee, Ill., assignor to Martin Engineering Company, Neponset, Ill.

Filed Oct. 14, 1988, Ser. No. 257,504
Int. Cl.[4] B65G *21/20*
U.S. Cl. 198—836 **14 Claims**



1. A skirt board mountable adjacent a mounting plate to contact a conveyor belt and seal against the escape of conveyed material, said skirt board including a pair of opposed side faces, at least one of which is formed so as to define a specially constructed engagement surface which includes a plurality of grooves oriented to define a ratchet surface and adapted when contacted by a stop means having a projection, to permit movement of said skirt board toward said conveyor belt but to retard movement of said skirt board away from said belt.

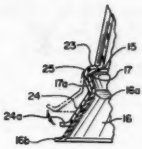
4,874,083

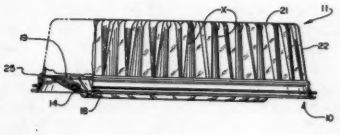
SERVING TRAY AND COVER THEREFOR

Patricia A. Antoni, Wheeling; Timothy J. Nolan, Streamwood; Thomas J. Hayes, Wauconda; Theodore R. Arneson, Mt. Prospect, and Jerry E. Coleman, Wheeling, all of Ill., assignors to Packaging Corporation of America, Evanston, Ill.

Filed Mar. 1, 1988, Ser. No. 162,419
Int. Cl.[4] B65D *25/00*
U.S. Cl. 206—45.32 **20 Claims**

1. A food serving tray for use with a removable cover, said tray being formed of thin gauge material and comprising a center section, a rim section disposed in spaced encompassing relation with respect to said center section, and an intermediate section interconnecting said center and rim sections; said rim section including a ledge portion having an inner segment connected to the intermediate section, and a continuous skirt portion downwardly extending from an outer segment of the





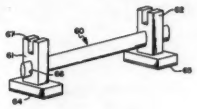
ledge portion, said skirt portion having upper edge segments spaced from the underside of said ledge portion and cooperating therewith to form a plurality of spaced, outwardly extending, substantially rigid marginal lips, each lip being adapted to be lockingly engaged by an encompassing yieldable peripheral segment of the cover when the tray and cover are in assembled relation.

4,874,084

COLOR CODING DEVICE, KIT OF COMPONENTS THEREOF, AND METHODS OF CONSTRUCTING AND UTILIZING SAME

Richard A. Strausser, Yale, Mich., assignor to Hope Sexton, Yale, Mich.

Filed Mar. 7, 1988, Ser. No. 164,507
Int. Cl.[4] B65D *85/16*
U.S. Cl. 206—231 **9 Claims**



1. A kit of components, comprising:

a plurality of one piece unitary, integral, resilient clips;

said plurality of clips are provided in color coded pairs of said clips so that the color of any particular color coded pair of said clips is different than the color of all the remainder of said color coded pairs of said clips; and

a holder for selectively and releasably securing and displaying said clips having an elongated shaft with a cross-section which substantially conforms to the shape of said plurality of clips, said shaft being integral with a base member substantially the length of said shaft.

6. A kit of components, comprising:

a plurality of one piece unitary, integral, resilient clips;

said plurality of clips are provided in color coded pairs of said clips so that the color of any particular color coded pair of said clips is different than the color of all the remainder of said color coded pairs of said clips;

a holder means selectively and releasably securing and displaying said clips having two end pieces for slidably and removably receiving an elongated shaft to which said plurality of color coded pairs of clips are selectively and releasably secured and displayed.

9. A kit of components, comprising:

a plurality of one-piece unitary, integral, resilient clips;

each said clip comprises a one-piece unitary integral main portion provided with an integral first arm at a first end thereof and an integral second arm at a second end thereof:

said plurality of clips are provided in adjacent color coded pairs of said clips so that the color of any particular color coded pair of said clips is different than the color of all the remainder of said color coded pairs of said clips; and

said color coded pairs of clips are used to aid in the assembly and disassembly of automobile engines such that one of said pair of color coded clips is used to identify a first part and the other of said pair of color coded clips is used to identify a second part to be mated to said first part so that said first and second parts may easily be put together.

4,874,085

STORAGE CASSETTE FOR HIGH STORAGE DENSITY, DISC-SHAPED INFORMATION CARRIERS

Hermann Grobecker, Garbsen; Werner Heher, Lehrte; Adelbert Zielasek, Burgwedel, all of Fed. Rep. of Germany, and Frederik B. Nusselder, Bussum, Netherlands, assignors to Polygram GmbH, New York, N.Y.

Division of Ser. No. 145,749, Jan. 19, 1988, abandoned, which is a continuation of Ser. No. 829,062, Feb. 13, 1986, abandoned, which is a division of Ser. No. 459,232, Jan. 19, 1983, abandoned. This application Oct. 18, 1988, Ser. No. 259,554

Claims priority, application Fed. Rep. of Germany, Feb. 16, 1982, 3205478

Int. Cl.[4] B65D *85/30*

U.S. Cl. 206—309 **9 Claims**

1. A storage container for an information record having a peripheral edge; an information area adjacent the peripheral edge carrying information tracks; and a central area adjacent the information area, said central area being free of information tracks and having a central hole having an inner surface,

said container comprising a box-like bottom and a cover,

said bottom having an inside bottom surface, edge means extending from said bottom surface and defining an open top, an elevated rest carried by said bottom surface, said elevated rest having a substantially planar surface for receiving and supporting an information record placed in the container only in its central area, and a central peg arrangement carried by said rest for engaging the inner surface of the central hole,

in a closed condition of the container said cover extending between said edge means and closing said top, and

said central peg arrangement and elevated rest together forming a sole means for retaining the information carrier in such position with respect to the container that the record information area and the peripheral edge are free of contact with the container, independent of the orientation of the container.

4,874,086

FILM CARRIER AND A METHOD FOR MANUFACTURING A SEMICONDUCTOR DEVICE UTILIZING THE SAME

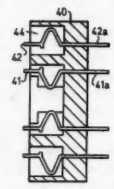
Makoto Imamura, and Ryouichi Miyamoto, both of Kawasaki, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 20, 1988, Ser. No. 196,670

Claims priority, application Japan, Jun. 8, 1987, 62-141392

Int. Cl.[4] H01L *39/02*

U.S. Cl. 206—330 **9 Claims**



1. A film carrier for a semiconductor device being tested in a tester having a plurality of test pins arranged in at least one group of test pins with a predetermined interval between adjacent pins, comprising:

a film substrate; and

conductive lead means supported by the substrate for electrical connection with the semiconductor device, including

(i) temporary testing lead portion means for contacting the test pins during testing of the semiconductor device, including a plurality of substantially parallel test segments with a predetermined gap between adjacent test segments, and

(ii) circuit lead portion means for connecting the semiconductor device to a circuit after removal of the test segments from the conductive lead means following testing, including a plurality of substantially parallel circuit segments with a predetermined space between adjacent circuit segments, the space being smaller than the gap

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4,874,087

PAINT BRUSH HOLDER

James K. Mayne, Southwick, Mass., assignor to American Brush Corporation, Claremont, N.H.

Continuation of Ser. No. 776,212, Sep. 16, 1985, abandoned. This application Mar. 18, 1988, Ser. No. 169,739

Int. Cl.[4] B65D *83/10*

U.S. Cl. 206—362.4 **3 Claims**

1. A display device for holding paint brushes structured to define a first holder for receiving a brush having a handle and carried by said display device, a second holder for receiving a card bearing instructions for use of the brush, said second

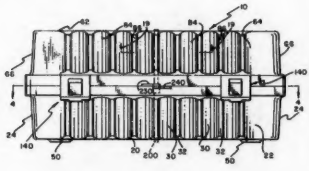
holder comprising first and second coextensive, elongate, rectangular panels connected throughout their longitudinal edges to each other to form a mounting means and separable between said edges such as to define a first pocket for slidingly receiving the card, such first holder comprising a third rectangular panel mounted to the face of one of the first and second panels, said third panel being narrower in width and shorter in length than said panels and being positioned with its edges symmetrically spaced from said edges of the panels and with its ends spaced from the ends of the panels with one end at a greater distance than the other from the end of the first and second panels and in spaced parallel relation to the panels so as to define therewith a second pocket for receiving the brush, a ledge at the inner side of the third panel at the lower edge for engagement with the ferrule of the brush to suspend the brush therein and an aperture in the third panel at the top to expose the bristles of the brush for inspection, a portion of said mounting means extending below said ledge for a distance at least as great as the length of said brush handle, and suspending means for suspending said display device for display or storage.

4,874,088

CONTAINER AND METHOD FOR CARRYING AND TRANSPORTING COMPUTER TAPE CARTRIDGES

David G. Leben, 105 S. Broadway, Suite 640, Wichita, Kans. 67202

Filed Dec. 21, 1988, Ser. No. 287,739
Int. Cl.[4] B65D *25/18, 85/67*
U.S. Cl. 206—387 **15 Claims**



1. A container for carrying and transporting computer tape cartridges and the like comprising

a container base having a base bottom, a pair of base hollow upright side walls integrally secured to said base bottom, and a pair of base end walls integrally secured to said base bottom and to said base side walls, each of said base hollow upright side walls having a base outside wall and a base inside wall with said base outside wall having a structure defining a plurality of hollow dome-shaped protrusions spaced by an abridging outside wall member and with said base inside wall having a structure defining a plurality of hollow dome-shaped ribs spaced by an abridging inside wall member, and said base bottom having a base outside wall and a base inside wall having a structure defining a plurality of hollow dome-shaped ridges spaced by an abridging base inside wall member, said dome-shaped ribs integrally connected to said dome-shaped ridges; and

a container lid pivotally secured to said container base, said container lid having a structure defining a handle recess.

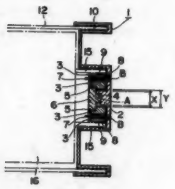
4,874,089

LIGHT-TIGHT CASSETTE

Tsukasa Matsuda; Kazuo Ui, and Hiroshi Maeda, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigawa, Japan

Filed Nov. 3, 1988, Ser. No. 266,846
Claims priority, application Japan, Nov. 6, 1987, 62-279355
Int. Cl.[4] B65D *85/38*
U.S. Cl. 206—397 **2 Claims**

1. In a light-tight cassette for a roll of light-sensitive strip material comprising a body having a slot for extending the light-sensitive strip material and end panels closing both end openings of the body and supporting said roll, the improvement which comprises at least one of the end panels having a



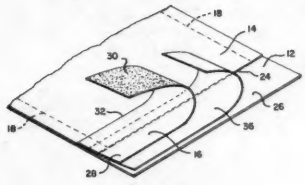
rotary core to which the core of the roll is fixed, a bearing means which rotatably supports the rotary core and a curing type hot-melt adhesive to releasably fix the rotary core to the end panel.

4,874,090

SELF-SEAL STERILIZATION POUCH

Denis G. Dyke, Edinboro, Pa., assignor to American Sterilizer Company, Erie, Pa.

Filed Oct. 24, 1988, Ser. No. 261,197
Int. Cl.[4] B65D *33/16*
U.S. Cl. 206—439 **8 Claims**



1. A sterilizable pouch comprising:

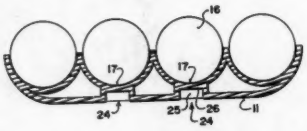
a first sheet-like member made of a material which is impermeable to microorganisms and a second sheet-like member, opposing said first member, made of a material which is impermeable to microorganisms, and one or both of said first and second members having at least a portion thereof made of a material which is permeable to gases, said first member extending outwardly beyond one edge of said second member to define a flap, said edge of said second member and said flap defining an opening therebetween, said first member and said second member being sealed to one another along all edges thereof except for said opening to define said pouch for receiving items to be sterilized;

sealing means having an upper surface and an adhesive coated lower surface connected along one edge to said second member proximate said opening; and

a liner for removably covering said adhesive coated lower surface;

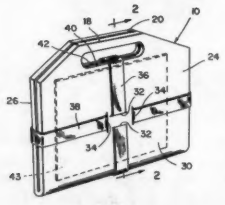
said sealing means being dimensioned to cover said opening and at least a portion of said flap adjacent said opening when said liner is removed and said adhesive coated lower surface is pressed against said opening and said flap to close and seal said opening.

4,874,091
CORE SAMPLE BOX
Albert R. McEwen, 303-10124-159th Street, Edmonton, Alberta, Canada T5P 2F9, and William J. Forrest, 15-9510 Morinville Drive, Morinville, Alberta, Canada T0G 1P0
Filed Jul. 14, 1988, Ser. No. 218,955
Int. Cl.[4] B65D *85/20*
U.S. Cl. 206—443 17 Claims



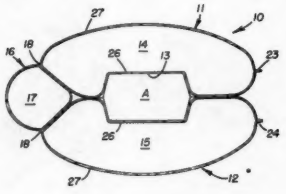
1. A container for drill core samples comprising an integrally molded body defining a core engaging layer and an outer layer, said core engaging layer having two elongate longitudinal side edges and two transverse end edges and between said side edges a plurality of elongate parallel receptacles arranged side by side each for receiving a length of core sample and each having a surface against which the sample engages shaped to confine the sample against vertical movement toward the layer and against side to side movement, said outer layer being connected to said core engaging layer at said side edges and at said transverse end edges and being spaced therefrom to define a hollow interior of the body therebetween and including a plurality of separate, spaced, molded indented portions thereof each engaging and connecting with a separate portion of said core engaging layer.

4,874,092
X-R CASE
Francisco J. Lara, Harlingen, Tex., assignor to Ferrero & Wepfer, Harlingen, Tex., a part interest
Filed Jul. 14, 1988, Ser. No. 218,921
Int. Cl.[4] B65D *27/00*
U.S. Cl. 206—492 8 Claims



1. A case for containing hand-carrying panels to be protected during storage and transit, said case including an elongated panel construction incorporating opposite side longitudinal edges and opposite end transverse edges, said panel assembly including hinge defining means extending transversely thereof centrally immediate said opposite end edges and dividing said panel assembly into a pair of opposite end panel sections relatively angularly displaceable about said hinge defining means between substantially coplanar open positions and closely juxtaposed parallel closed positions with one pair of corresponding inner sides of said panel sections opposing each other and the other pair of corresponding outer sides of said panel sections facing outwardly of said case in opposite directions, one of said panel sections including a pair of first laterally spaced parallel slots formed therethrough, extending transversely of said panel assembly and centrally located on said one panel section, said one panel section also including a pair of second laterally spaced parallel slots formed therethrough, extending longitudinally of said panel assembly and centrally located on said one panel section, first and second strap means threaded through said first and second pair of slots, respectively, with longitudinal mid-portions of said first and second straps extending over the inner side of said one panel section between said first and second slots, said strap means each including end portions thereof projecting outwardly of the ends of said slots opening through the outer side of said one panel section, said end portions extending over the outer side of said one panel section away from remote sides of the corresponding slots, said end portions of said first and second strap means being of sufficient length to extend lengthwise and transversely of and about said panel assembly when said panel sections are in the closed position with the terminal ends of the end portions of each strap means overlap engaged with each other closely outward of the outer side of the other panel section, said terminal ends of each said strap means including coacting fastening means operative to releasably secure each pair of overlap engaged terminal ends together.

4,874,093
CLAM-LIKE PACKAGING SYSTEM
Daniel A. Pharo, 1901 Ave. of the Stars, Suite 450, Los Angeles, Calif. 90067
Continuation-in-part of Ser. No. 89,228, Aug. 25, 1987. This application Oct. 25, 1988, Ser. No. 262,537
Int. Cl.[4] B65D *81/02*
U.S. Cl. 206—522 10 Claims



1. A packaging system having opposite frontal and rearward sides and opposite lateral sides, said packaging system comprising

a first bag portion defining a first chamber means therein for being at least partially filled with a filler medium,

a second bag portion defining a second chamber means therein for being at least partially filled with said filler medium, said first bag portion overlying said second bag portion to define a pocket therebetween adapted to have an article retained therein and the frontal side of each of said first and second bag portions being closed,

connection means for connecting said first and second bag portions together at the rearward side of said packaging system, said connection means comprising at least one seam formed transversely across said first and second bag portions to secure them together and wherein said seam is formed at the rearward side of said packaging system to define at least one passage between said first and second bag portions inter-communicating said first and second chamber means, and

seam means securing overlying side edge portions of said first and second bag portions together at each of the lateral sides of said packaging system, said first and second bag portions remaining unattached to each other at the frontal side of said packaging system, between the closed frontal sides of said first and second bag portions, to expose said pocket thereat, said first and second bag portions each being formed by a pair of overlying first and second panels and wherein said first panels oppose each other to define said pocket therebetween and said seam means are

formed at overlying side edge portions of said first and second panels.

4,874,094

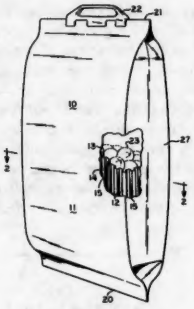
CUSHIONED BAG

Richard H. Blanke, Jr., 9102 Clayton Rd., St. Louis, Mo. 63124

Continuation of Ser. No. 608,526, May 8, 1984, abandoned, which is a continuation of Ser. No. 433,636, Oct. 12, 1982, abandoned. This application May 19, 1986, Ser. No. 867,889

Int. Cl.[4] B65D *81/02*

U.S. Cl. 206—522 3 Claims



1. A cushioned bag comprising:

(a) an extruded plastic, continuously formed tubular outer wall,

(b) an extruded plastic, continuously formed tubular inner wall coextensive with said outer wall and having a plurality of spaced, longitudinally extending channel portions and longitudinally extending intermediate portions,

(c) continuous longitudinal sealing means, sealing said inner wall intermediate portions to said outer wall between the top and bottom of said bag and defining longitudinally extending columns, and

(d) continuous transverse sealing means, sealing said inner wall to said outer wall and cooperating with said longitudinally sealing means to define a plurality of sealed cushion columns of air and substantially sealing top and bottom of the bag shut.

4,874,095

EDGE PROTECTOR AND METHOD OF MAKING SAME

Hans Warych, Gelsenkirchen, Fed. Rep. of Germany, assignor to Signode System GmbH, Dinslaken, Fed. Rep. of Germany

Filed Jun. 3, 1988, Ser. No. 202,725

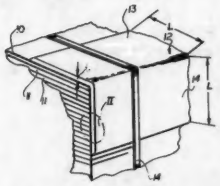
Claims priority, application Fed. Rep. of Germany, Jun. 3, 1987, 3718545

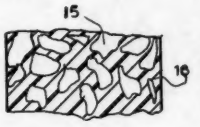
Int. Cl.[4] B65D *57/00*; B32B *5/16*

U.S. Cl. 206—586 6 Claims

1. An edge protector for a stack of articles consisting essentially of a formed mass molded under heat and pressure of paper-waste cuttings and thermoplastic synthetic resin binder, said edge protector having an angular cross section and being composed of packing paper coated on at least one side with the thermoplastic synthetic resin of said binder.

2. A package comprising a stack of articles, a moisture-resistant edge protector of L-shaped cross section fitted over at least one edge of said stack and consisting essentially of a formed mass molded under heat and pressure of paper-waste cuttings





and thermoplastic synthetic resin binder, and at least one strap surrounding said stack and braced against said edge protector.

4,874,096

SEALED PACKET WITH AN ADHESIVE STRIP FOR OPENING AND RECLOSING

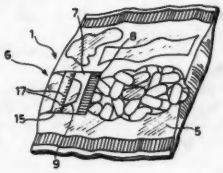
Emilio Tessera-Chiesa, Leumann, Italy, assignor to Sales S.p.A., Turin, Italy

Filed Jul. 5, 1988, Ser. No. 215,153

Claims priority, application Italy, Jul. 2, 1987, 53496/87[U]

Int. Cl.[4] B65D *3/26, 33/36*

U.S. Cl. 206—621 6 Claims



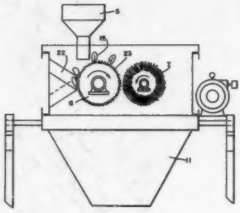
1. A packet with an adhesive strip for opening and closing a wall of said sealed packet containing food products in the form of pieces, particularly but not exclusively sweets and the like, and having a shaped cut in said wall, said adhesive strip being transparent and having an adhesive face with a non-adhesive gripper tongue at one end and applied in a partially detachable and re-attachable manner to the wall of the packet in correspondence with the cut therein, so as to achieve controlled tearing of the wall during first detachment of the adhesive strip in order to define an opening through which the products in the packet can be removed, said opening being reclosable by re-attachment of the adhesive strip, and indicator means associated with the adhesive strip to provide indications of any fraudulent opening of the packet, wherein the indicator means comprise a supplementary strip having a width which is less than the length of the adhesive strip and being disposed transversely beneath the adhesive strip, the supplementary strip extending through the cut in the packet and being operatively connected to the adhesive strip in such a manner that its condition is modified in a visually perceptible manner during the tearing of the wall during first detachment of the adhesive strip.

4,874,097

MECHANISM FOR SEPARATING THE CLOSED PISTACHIO NUTS FROM THE OPEN PISTACHIO NUTS OF AEGINA AND ROTTEN LEGUMES

Nikos Argiriadis, Meliteos 6, Neapoli, Thessaloniki 567.27, Greece

Filed Mar. 17, 1988, Ser. No. 169,588
Claims priority, application Greece, Mar. 19, 1987, 870447
Int. Cl.[4] B07C 5/34
U.S. Cl. 209—616 3 Claims



1. An apparatus for separating open or rotten legumes or pistachio nuts from closed or good legumes or pistachio nuts, comprising

a first elongated cylinder having outwardly projecting edges along its exterior surface;

a second cylinder having at least one brush on its outer circumference;

means for positioning said cylinders in side-by-side relationship at a longitudinal inclination so that said cylinders have an upper end and a lower end;

a laterally inclined plate adjacent said first cylinder on a side thereof opposite from said second cylinder, said inclined plate and said first cylinder forming a trough therebetween;

means for feeding plastic pistachio nuts or legumes to the upper end of said first cylinder so that said nuts or legumes fall in said trough;

means for rotating said cylinders in opposite directions whereby rejected nuts or beans are caught by said outwardly projecting edges and transferred by said first cylinder from said trough to said second cylinder; and

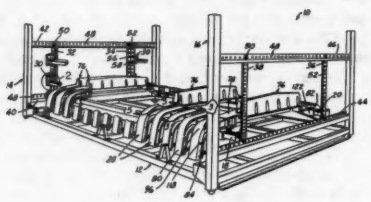
collection means for good pistachio nuts or legumes at the lower end of said first cylinder.

4,874,098

SHIPPING RACK FOR VEHICLE AIR DAMS

Julie M. Moulds, Royal Oak, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.

Filed Apr. 4, 1988, Ser. No. 177,214
Int. Cl.[4] A47F 7/00
U.S. Cl. 211—13 5 Claims



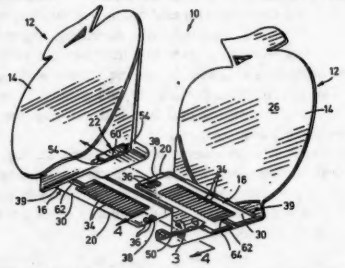
1. A shipping rack for vehicle air dams, the dams being of the type fabricated of flexible plastic material and comprising an elongated central portion for positionment beneath the bumper of a vehicle, relatively short end portions extending from the central portion, the end portions adapted to wrap around the sides of a vehicle, each end portion having, when positioned on the rack, a generally verically extending wall section with an opening provided therein, the central portion having, when positioned on the rack, a generally horizontally extending tab at each end thereof, each of said tabs extending towards the wall section of the adjacent end portion, the shipping rack including a bottom wall having a length and a width, an upstanding end wall at each end of the length of the bottom wall, a pair of generally parallel support bars extending between said end walls, at least one air dam support member carried on each support bar, said air dam support members being oppositely disposed, the support members each having a generally triangular shape defining a generally horizontal support surface and a generally vertical support surface, a pin extending outwardly from one side of each air dam support member adjacent to the generally vertical support surface, each air dam support member having a slot therein adjacent to the generally horizontal support surface, a vehicle air dam received on and supported by said air dam support member with the outer ends of the central portion of the air dam supported by said surfaces and the air dam end portions supported by said generally vertical support surfaces with said pins extending through the openings in said wall sections and with said tabs extending into the slots provided in the air dam support member to thereby retain the air dam in place on the air dam support members.

4,874,099

NAPKIN HOLDER

John Arnott, and Gary Kaga, both of Toronto, Canada, assignors to Ontario Limited, Toronto, Canada

Filed Oct. 26, 1987, Ser. No. 112,161
Int. Cl.[4] A47F 7/00
U.S. Cl. 211—50 16 Claims



1. An adjustable holder having first and second opposed slideable end units, detent means and stop means, each of said end units having a support panel and a longitudinally extending base wherein:

(a) the base of said first end unit comprises a tongue having proximal and distal ends, said tongue having first and second substantially planar opposed surfaces;

(b) the base of said second end unit comprises a complementary slot having a longitudinally extending surface;

(c) said first opposed surface and said longitudinally extending surface comprising said detent means to prevent movement of one of said end units relative to the other of said end units; and

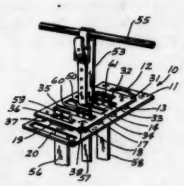
(d) said distal end of said tongue and said slot comprise said stop means and are dimensioned so that in at least one direction, the distal end of said tongue is larger than said slot such that when said tongue is inserted in said slot, an increased amount of external force must be applied to said adjustable holder to withdraw said tongue from said slot than to adjust the distance between the end units.

4,874,100

BELT HOLDER

Billie T. Smagula, 403 Balboa Dr., Universal City, Tex. 78148

Filed Dec. 5, 1988, Ser. No. 280,239
Int. Cl.[4] A47F 7/00
U.S. Cl. 211—60.1 7 Claims



1. A belt holder comprising:
a first rigid plate having a first elongated slot disposed therethrough;
a second rigid plate spaced from and rigidly affixed to said first rigid plate, a second elongated slot disposed therethrough, said second elongated slot being generally aligned with but larger than said first elongated slot in the first rigid plate;
means for attaching at least one of said first and second plates to a clothes closet bar whereby said belt holder is suspended therefrom; and
a flexible belt having a buckle attached to one end, said belt extending through said first slot and said buckle being disposed at least partially between the first and second rigid plates and within said second elongated slot, said one end of said belt having said buckle attached thereto being too large to pass through said first slot and whereby the other end of said belt hangs downwardly from said first rigid plate.

4,874,101

TAMPER EVIDENT CAP

Gregory J. Zalut, 24640 Laetham, East Detroit, Mich. 48021

Continuation-in-part of Ser. No. 52,072, May 21, 1987, abandoned. This application May 27, 1988, Ser. No. 201,329
Int. Cl.[4] B65D 41/34
U.S. Cl. 215—251 2 Claims

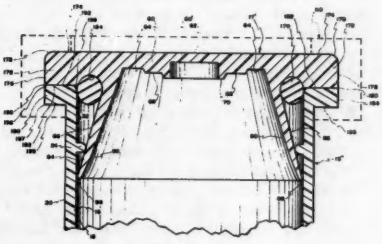
1. A tamper evident cap member (18) for a container comprising a substantially cup-shaped cap having a base portion (26) and an annular flange portion (28), said flange portion (28) including a threaded portion (31) spaced from said base portion (26), and a plurality of flexible fingers (52) extending into said cap member (18) from said base portion (26) for engaging an annular flange (50) of a cover member (16) and retaining the cover member (16) with the cap member (18) and against the base portion (26).

4,874,102

MEDICAL FAIL SAFE RELEASIBLE LOCKS AND/OR SEALS FOR CAPPED DISPOSABLE CENTRIFUGE CONTAINERS, CRYOGENIC VIALS AND THE LIKE

Paul M. Jessop, and David H. Jeffs, both of Salt Lake City, Utah, assignors to Multi-Technology Inc., Salt Lake City, Utah

Continuation-in-part of Ser. No. 191,518, May 9, 1988, Pat. No. 4,830,209. This application Oct. 31, 1988, Ser. No. 265,178
Int. Cl.[4] B65D 45/00
U.S. Cl. 215—273 13 Claims



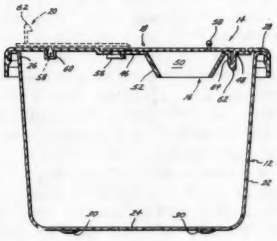
1. A combination comprising:
a liquid specimen container comprising wall means defining a closed distal end and an open proximal end;
a cap comprising male means which project into the container opening when the cap is closed;
a releasible externally-applied lock comprising means holding the cap and the container at the opening thereof in a leak-free closed state during centrifuging, boiling, freezing and like processing in a specimen testing laboratory, the lock being formed of synthetic resinous material with memory, the combination accommodating removal of all or part of the processed specimen from the container through the opening after the lock is externally removed and the cap is open;
seal means carried by the male means so as to be compressively interposed between the male means of the cap and the wall means of the container in sealing relation.

4,874,103

RECEPTACLE FOR RECEIVING INFECTIOUS WASTE MATERIAL

Tony M. Quisenberry, Austin, and Fred E. Wahlenmeier, San Antonio, both of Tex., assignors to Winfield Corporation, San Diego, Calif.

Filed Oct. 1, 1986, Ser. No. 914,111
Int. Cl.[4] B65D 90/00
U.S. Cl. 220—1 T 10 Claims



1. A disposable waste receptacle comprising:
a substantially imperforate container for holding the waste

and having an edge defining an opening, the edge including a lip structure;

a substantially flat cover overlying said opening and including pawl means for engaging said lip structure to nonreleasably lock the cover in place over the opening, the cover including:

a generally flat top portion having an outer periphery and a recess inwardly spaced from the outer periphery;

a substantially flat shoulder surface within the recess and generally parallel to the top portion;

an open trough for receiving the waste and defining an open aperture extending through the shoulder with the shoulder surrounding the aperture;

an engagement slot extending through the shoulder;

a lid hingedly coupled to the top portion for movement between a first position remote from the aperture and a second position overlying the aperture,

the lid having a projecting lug operatively received in the engagement slot with the lid in the second position, the lug operative to prevent return of the lid to the first position once the lug is received in the slot,

the lid being cooperatively dimensioned to the recess for reception therein, such that, in the second position, the lid adjoins the shoulder surface and the cover and lid are generally flat in relation to each other.

4,874,104

HOT WATER STORAGE TANK

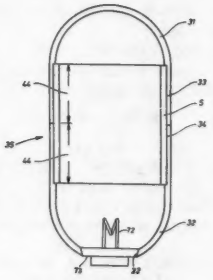
Josef Klammer, Esplanade 28, Gmunden, Austria 4810, and Werner Grosschädl, Hutterweg 2, Bad Ischl, Austria 4820

Filed Jul. 29, 1988, Ser. No. 225,967

Claims priority, application Fed. Rep. of Germany, Jan. 12, 1988, 3800699

Int. Cl.[4] B65D *6/16*; F24H *1/18, 9/14*

U.S. Cl. 220—4 B **18 Claims**



1. A hot water storage tank having an upper side and an underside, an access opening in said underside for a heating element positioned within the tank, and cold water supply, and hot water outflow, connectors communicating with the interior of the tank, the tank comprising at least two juxtaposed, vertical, pressure tight, cylindrical vessels interconnected by way of upper and lower piping connections, the cylindrical vessels being assembled from separate telescopic modular elements of plastic material which are relatively adjustable to determine a desired capacity of the tank, whereby said telescopic modular elements are bonded together after said desired capacity has been determined, said modular elements comprising a tubular central element and upper and lower lid elements attachable to the top and bottom, respectively, of said central element in overlapping relationship therewith, said piping connections communicating with said lid elements at apices thereof and said access opening, which is provided in a lower lid element, tapering outwardly thereof for the insertion of the heating element into said opening and securing it therein.

4,874,105

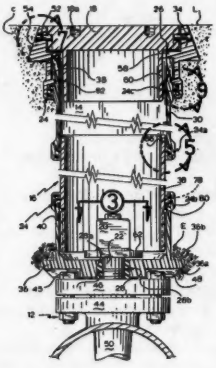
VALVE BOX

André Tetreault, 236 Cowie Street, Granby, Canada (J2G 3B8)

Filed Jan. 9, 1989, Ser. No. 294,748

Int. Cl.[4] B65D *88/76*; F16L *57/00*

U.S. Cl. 220—4 C **16 Claims**



1. A valve box for use with a water valve from an aqueduct branch pipe or the like, comprising: an upright, ground-engaging, elongated, tubular assembly, a cover member mounted to the top of said tubular assembly, first locking means to releasably lock said cover member to said tubular assembly, first gasket means to seal the connection of said cover member to said tubular assembly cooperatively with said first locking means, a floor member mounted to the bottom of said tubular assembly, second locking means to releasably lock said floor member to said tubular assembly, second gasket means to seal the connection of said floor member to said tubular assembly; said floor member having a through-bore for rotatably receiving an operative shaft of said valve, said shaft having gripping means at its free end adapted to project within said tubular assembly; and third gasket means, to seal the connection between said shaft and said floor member.

4,874,106

COLLAPSIBLE CONTAINERS

Edward S. Robbins, III, 459 N. Court St., Florence, Ala. 35630

Filed Sep. 7, 1988, Ser. No. 241,378

Int. Cl.[4] B65D *6/22*

U.S. Cl. 220—4 F **37 Claims**

1. A collapsible container comprising:

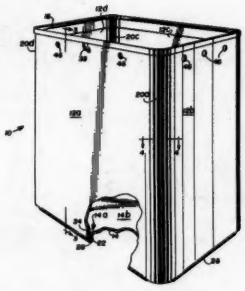
plural side walls;

hinge means joining adjacent side walls so as to allow said side walls to be moved between (a) a collapsed condition in which said side walls lie substantially flat, and (b) an erected condition in which said side walls define, in cross-section, an interior area for receiving articles therewithin;

a bottom wall which establishes a peripheral edge region sized and configured so as to closely match said interior area of said erected side walls; and

means for removably coupling said bottom wall to lower regions of said side walls when in said erected condition, whereby said side walls are maintained in said erected condition, wherein

said bottom wall includes seal means extending upwardly from said peripheral edge region and providing sealing



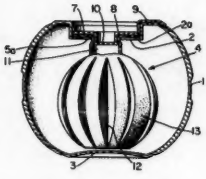
contact with said side walls when said bottom wall is removably coupled to said lower regions thereof.

4,874,107

MULTIPLE COMPARTMENT CONTAINER

José L. Arnau-Munoz, Montigny-Le-Bretonneux, and Henri Cornette, Pontoise, both of France, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 25, 1988, Ser. No. 173,490
Claims priority, application France, Mar. 25, 1987, 87 04168
Int. Cl.[4] B65D *25/00*
U.S. Cl. 220—20 **15 Claims**



1. Single-use container for packaging substances which do not exhibit satisfactory compatability when brought together, said container comprising:

(a) a generally rigid outer enclosure of overall spherical shape defining a compartment and having an opening, said compartment being adapted to hold a liquid; and

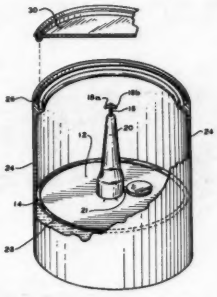
(b) an expandable inner compartment generally within said outer enclosure and having an orifice disposed peripherally to said inner compartment and said compartment defined by said outer enclosure, the mouth of said orifice being encircled by an annular flange having a plurality of holes therein which access the interior of said outer enclosure, said annular flange adjoining the edges of said opening, said inner compartment being adapted to hold a liquid and having an unexpanded position and an expanded position, the transverse dimension of said inner compartment allows passage of said inner compartment through said opening when said inner compartment is in the unexpanded position, the transverse dimension of said inner compartment being greater than said opening when said inner compartment is in the expanded position.

4,874,108

SEALER FOR CONTAINERS

Raymond J. Valasek, Newberg, Oreg., assignor to Chromatic Paint Corporation, Stoney Point, N.Y.

Filed Nov. 3, 1988, Ser. No. 266,647
Int. Cl.[4] B65D *25/10*
U.S. Cl. 220—93 **14 Claims**



1. A sealing means for use with a container, said container including an interior wall portion, said sealing means comprising:

a sealing portion, said sealing portion having a cross-sectional area at least that of the interior cross-sectional area of said container, said sealing portion having a perimeter portion sealingly engageable with said interior wall portion of said container;

a handle portion attached to said sealing portion; and

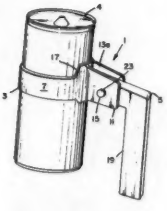
a tube, said tube having a length less than that of said handle portion, said tube surrounding at least said handle portion, and said sealing portion is retractable within said tube upon pulling of said handle portion.

4,874,109

CAN HOLDER

John L. Cook, 23638 Anza Ave., Ste. E, Torrance, Calif. 90505

Filed Oct. 27, 1988, Ser. No. 263,544
Int. Cl.[4] B65D *7/42*
U.S. Cl. 220—94 R **8 Claims**



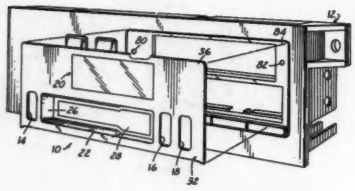
1. A can holder assembly comprising a collar, said collar having an inner surface and an outer surface, two semirigid lugs integrally mounted on said outer surface, said lugs being substantially parallel to each other, spaced apart to receive a handle projection, and having substantially smooth opposing faces, means in each lug to receive rotatably protrusions on each side of said handle projection, said handle projection having a camming face on one end and a handle on the other end, the camming face being located down and away from the collar when the handle is in the raised position and pressing against a locking tab which is an integral part of the collar and located between the lugs when the handle is depressed.

4,874,110

LENS STRUCTURE FOR A COMBINED RADIO/AUDIO TAPE CASSETTE PLAYER OR THE LIKE

Frank H. Klein; Steven F. Selby, and Sigmund Klueger, all of Huntsville, Ala., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Oct. 27, 1988, Ser. No. 263,316
Int. Cl.[4] H02G *3/41;* B65D *51/18*
U.S. Cl. 220—241 **6 Claims**



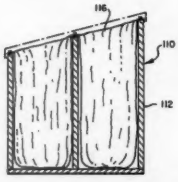
1. A lens structure for a combined vehicle radio/audio tape cassette player or the like to permit display of information generated by the combined vehicle radio/audio tape cassette player, the lens structure comprising a forward panel injection molded of a clear thermoplastic resin, the forward panel having an opening therein for insertion of an audio tape cassette, the forward panel having a forward surface and a rearward surface, a lens portion on said rearward surface projecting rearwardly therefrom, the lens portion forming, with the contiguous forward portin of the forward panel, a lens, a rearward panel injection molded of an opaque thermoplastic resin onto the forward panel and heat fused to the portion of the rearward surface of the forward panel adjacent to, but not including, the rearward surface of said lens, a door, hinge structure pivotally mounting the door on the rearward panel over the tape cassette opening, and spring means urging the door to a normally closed position blocking the tape cassette opening.

4,874,111

MULTI-COMPARTMENT REFUSE CONTAINER

Cletas Heller, Du Bois, Pa., assignor to Heller Triangle Spring Co., Du bois, Pa.

Filed Jan. 27, 1989, Ser. No. 303,716
Int. Cl.[4] B65D *25/16*
U.S. Cl. 220—404 **6 Claims**



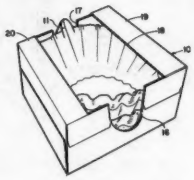
1. A multiple compartment refuse container comprising:
(a) a container, said container provided with at least one internal partition, said at least one partition dividing said container into at least two compartments, each of said compartments adapted to receive a trash liner;
(b) a plurality of pin receiving members provided on a top surface of said at least one partition;
(c) a plurality of pins sized to fit into said pin receiving members on said at least one partition, said pins adapted to secure said trash liners in each of said compartments; and
(d) a removable lid sized and positioned to fit over and seal said container.

4,874,112

FILTER DISPENSER

Merle W. Mulder, 0-288 Begole, SW., Grand Rapids, Mich. 49504, and Vernon J. Mol, III, 1627 Havana, SW., Wyoming, Mich. 49509

Filed Mar. 23, 1987, Ser. No. 29,088
Int. Cl.[4] B65G *59/00;* B65H *1/00*
U.S. Cl. 221—1 **2 Claims**



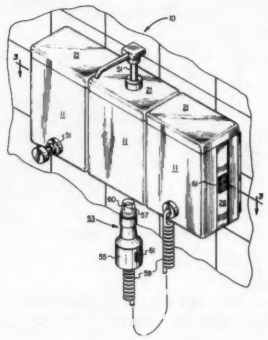
1. A method of preparing a stack of interengaged pleated frusto-conical sheets of material for removal of said sheets one-by-one from said stack, comprising:
turning said stack inside-out.

4,874,113

DISPENSERS FOR COSMETICS

Laurie H. Schmidt, P.O. Box 541237, Dallas, Tex. 75354-1237

Filed Feb. 22, 1988, Ser. No. 158,798
Int. Cl.[4] B67D *5/60*
U.S. Cl. 222—143 **8 Claims**



1. A dispenser for cosmetics adapted to constitute a unit of a modular array of essentially similar dispensers and comprising a body of substantially rectangular horizontal cross-section, having front, rear and side walls, a bottom and a top wall; the side walls of said dispenser having respective male and female alignment means of complementary shape, whereby two such dispensers can be aligned in an aligned, side by side, array with the male alignment means of one dispenser engaged with the female alignment means of the other; said male and female alignment means extending substantially vertically over at least the major part of the wall surface whereby the two dispensers can be aligned by vertical relative motion between them; mounting means for the dispenser, said mounting means comprising a plate, separate from the dispenser, adapted to be secured to a vertical surface, such as a wall, the plate being of substantially the same width as the rear wall of the body, whereby when two dispensers are arranged in said array, the

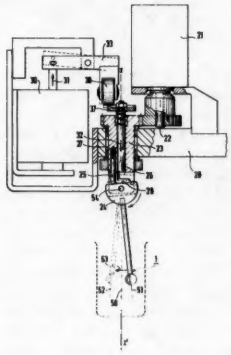
outer vertical edges of their respective plates are in contact, said plate having an upwardly open channel extending from the upper edge of said plate and closed at its lower end, said channel receiving, in use, a flanged member provided on the rear wall of the dispenser and having spaced apart side portions engaging the edges of the channel.

4,874,114

DEVICE FOR DISPENSING A PREDETERMINED QUANTITY OF A LIQUID

Jean Guigan, 9, rue Jean Mermoz, 75008 Paris, France

Filed Nov. 10, 1988, Ser. No. 269,349
Claims priority, application France, Nov. 13, 1987, 8715688
Int. Cl.[4] B67D *5/64*
U.S. Cl. 222—168 5 Claims



1. A device for dispensing a predetermined quantity of a liquid, the device comprising:

a pipette constituted by a rod having a substantially spherical element fixed at one end thereof, said element comprising a hollow hemisphere partially closed by a diametrical partition, thereby defining a volume corresponding to said predetermined quantity, a portion of spherical cap extending from said hemisphere to form a liquid inlet chamber which is wide open, said chamber including a peripheral opening leading to the outside and an opening through said partition and putting it into communication with said volume, said two openings being at a distance from the center of said hemisphere;

mechanical means for holding the free end of said rod in such a manner that the pipette is either in a first position for filling and for calibration purposes, or else in a second position for emptying purposes, said two positions corresponding to said diametrical partition being tilted symmetrically in two different directions relative to a vertical plane; and

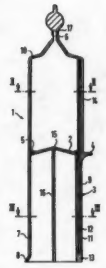
means for rotating said pipette at high speed about a vertical axis both in said first position and in said second position, with the hemisphere being further from the axis of rotation than said inlet chamber when in said first position, and closer in said second position.

4,874,115

DISPENSER FOR PASTY OR FLOWABLE MEDIA

Georg Weihrauch, Wald-Michelbach, Fed. Rep. of Germany, assignor to Coronet-Werke Heinrich Schlerf GmbH, Wald-Michelbach, Fed. Rep. of Germany

PCT No. PCT/EP86/00634, § 371 Date Jul. 13, 1987, § 102(e) Date Jul. 13, 1987, PCT Pub. No. WO87/02971, PCT Pub. Date May 21, 1987
PCT Filed Nov. 4, 1986, Ser. No. 85,567
Claims priority, application Fed. Rep. of Germany, Nov. 12, 1985, 3539999
Int. Cl.[4] B67D *5/42, 5/22*
U.S. Cl. 222—386 8 Claims



1. Dispenser for pasty or flowable media, the dispenser comprising a container for accommodating the media, a delivery opening provided on the container for enabling a dispensing of the media, a piston displaceably guided along a wall of the container and forming a lower seal for the media accommodated in the container, a guide part formed by the wall of the container at a position below the lower seal formed by the piston, displacing means including an externally located handle for displacing the piston in a direction of the delivery opening, said displacing means including a slide having a downwardly open slot for accommodating a portion of the wall of the container, said downwardly open slot being disposed in parallel to a longitudinal axis of the container and having a length corresponding to a total stroke of the piston, said downwardly opening slot being defined between an internal wall connected to an upper end of the piston and an external wall connected at one end to the externally located handle such that the slide is a double-walled slide guided on the guide part, and wherein at least one additional guide means is provided on the external portion of the container at least in an area containing the filled media.

4,874,116

GAS BLENDING APPARATUS

Merton R. Fallon, Woodland Hills, Calif., and Thomas W. Clements, Ambler, Pa., assignors to McDantim, Inc., Woodland Hills, Calif.

Filed Jun. 1, 1988, Ser. No. 201,002
Int. Cl.[4] B65D *83/14;* B67D *1/04, 1/12*
U.S. Cl. 222—399 10 Claims

6. A beverage dispensing system, comprising:

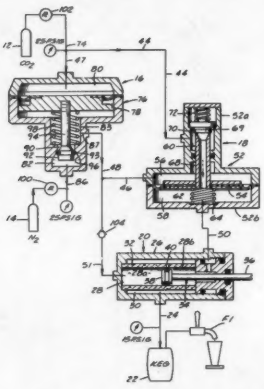
(a) a container including dispenser means from which beverage is to be dispensed by the pressure of a gaseous mixture comprising a first gas containing nitrogen and a second gas containing carbon dioxide;

(b) a source of said first gas under pressure;

(c) a source of said second gas under pressure;

(d) a gas blending means in communication with said container and in communication with said sources of first and second gases for blending said gases into a gaseous mixture of adjustable proportions; said gas blending means comprising a housing having first and second chambers

divided by a porous member and including reciprocal means reciprocally movable within said first chamber from a first position to a second position to divide said first chamber into first and second portions of varying volumes, said second chamber being in communication with said container, said first portion of said first chamber being in communication with said source of said first gas and said second portion of said first chamber being in communication with said source of said second gas;



(e) a pneumatic relay means in communication with said gas blending means and said sources of said first and second gases for supplying said second gas to said gas blending means upon demand resulting from beverage being dispensed from said container; and

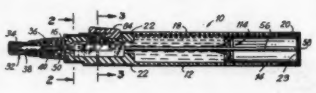
(f) control means in communication with said sources of said first and second gases for controlling the flow of said first gas to said pneumatic relay means and to said gas blending means.

4,874,117

MANUALLY-OPERATED FLUID DISPENSER AND ASSOCIATED CLOSURE CAP

Nathan Kay, Encino; Donald W. McNab, Long Beach, and Edward J. Moya, San Gabriel, all of Calif., assignors to Photofinish Cosmetics Inc., Encino, Calif.

Filed May 17, 1988, Ser. No. 194,840
Int. Cl.[4] B67D 3/00
U.S. Cl. 222—487 **38 Claims**



1. In a fluid dispenser for manually-effected operator-controlled discharge of a stored fluid:

an elongated dispenser housing defining an interior space for storing fluid dischargeable from the housing, said housing including a fluid discharge opening and a vent opening proximate opposite ends of the housing;

variable length means normally urged to a maximum longitudinal extension between and for concurrently closing said fluid discharge and vent openings; and

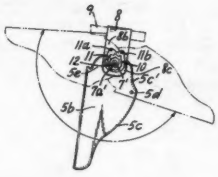
fluid discharge actuating means operatively movable between a first and a second position for causing foreshortening of said variable length means relative to said maximum longitudinal extension to space said variable length means from and concurrently open said fluid discharge and vent openings whereby stored fluid is discharged from said dispenser through said fluid discharge opening and air enters the housing through said vent opening.

4,874,118

PISTOL HOLSTER WITH LIMITING SWING CLUTCH

John K. Parlante, 998 Sheldon Ave., Staten Island, N.Y. 10309

Filed May 19, 1986, Ser. No. 864,261
Int. Cl.[4] F41C 33/02
U.S. Cl. 224—198 **10 Claims**



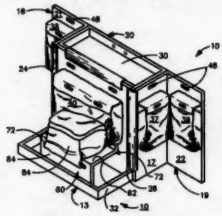
1. A swivel joint fastner device comprising in combination a first element having a first head having a substantially flat first under-face and having a male-threaded shaft and male threads thereof extending from said first head's said first under-face surface, a second element having a second head with a substantially flat second under-face surface and having a female-threaded shaft and female threads thereof extending from said second under-face surface, a flexible washer mounted in juxtaposition to said second underface surface and around said female-threaded shaft, a plurality of separate members each pivotably mounted on said female-threaded shaft and compressed between said first under-surface and said flexible washer such that each of said separate members is oppositely rotatable around said female-threaded shaft relative to a remaining other one of the separate members and such that each of the separate members is flexible toward and away from a remaining other one of the separate members, and a swivel-limiting means for limiting number of degrees of rotation of one of said separate members relative to a remaining one of said separate members, mounted on said female-threaded shaft in a compressed state of being compressed tightly between adjacent revolvable elements each having a substantially flat face compressed flushly against the flat face of the other, and each having flange means limiting the extent of each revolvable member's revolving movement around said female-threaded shaft relative to the other revolvable member, said compressed state being of sufficiently high compression to maintain said flat faces in a compressed operative state, and said flexible washer flexibly yielding sufficiently to permit said separate members of the swivel-limiting means to revolve one relative to the other while concurrently avoiding excessive pressure on said male and female shafts and heads thereof, said excessive pressure being pressure sufficiently high for one of said male threads and of said female threads to shear-off a remaining one of said male threads and of said female threads with a resulting shearing-off of the head of one or more of the first and second elements when exerted against at-least one of the first and second heads, thereby making possible a flexing of the separate members toward and away from each other and thereby avoiding said excessive shearing pressures on said first and second heads of said first and second elements during such flexing.

4,874,119

TOOL PACK APPARATUS

Robert W. Winter, 1530 Eisenhower, #242, Boulder, Colo. 80303

Filed Nov. 4, 1988, Ser. No. 267,229
Int. Cl.[4] A45F 3/02; A47B 81/00
U.S. Cl. 224—202 54 Claims



1. A tool pack for repair personnel adapted for carrying work items such as tools, equipment, parts and the like comprising:

a back panel having a front surface, a back surface, a back panel upper edge portion, a back panel lower edge portion and first and second back panel side edge portion, said back panel defining a back of the tool pack;

a bottom panel having a bottom panel rear edge portion rigidly attached to the back panel lower edge portion, said bottom panel extending forwardly of said back panel to define a base for the tool pack;

a lid member including a top panel portion defining a top for the tool pack, said lid member pivotally mounted to the back panel upper edge portion and pivotable between a closed position in which the lid member extends forwardly of said back panel in a position above said bottom panel and an open position in which the lid member extends rearwardly of said back panel, said top panel having a first surface facing the bottom panel when the lid member is in the closed position;

first and second door members, said first door member having a first front panel and a first side panel attached to one another and a first door rear edge portion opposite said first front panel, said first door member pivotally mounted along said first door rear edge portion to the first back panel side edge portion, and said second door member having a second front panel and a second side panel rigidly attached to one another and a second door rear edge portion opposite said second front panel with said second door member pivotally mounted along said second door rear edge to the second back panel side edge portion, said first and second door members pivotable between a door closed position and a door open position wherein said first and second front panels in the door closed position extend in spaced relation in front of said front surface to define at least a portion of a front of the tool pack and wherein said side panels extend forwardly of said back panel to define sides of said tool pack and wherein said side panels in the door open position extend rearwardly of said back panel, said first and second door members each having top edge portions which are movable into abutting relation with said lid member when said lid member is in the open position and said first and second door members are moved into the door open position; and

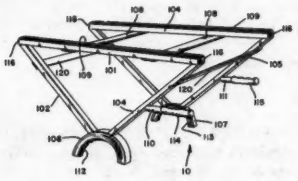
means for releasably securing the lid member to each of said first and second door members when said lid member is in the open position and when the first and second door members are in the door open position whereby said door members support the lid member above a support surface on which the tool pack is placed, whereby the first and second door members in the open position help prevent the tool pack from tipping in a rearward direction when the tool pack is placed on the support surface, and whereby the lid member when in the closed position and the first and second door members when in the door closed position enclose a compartment in which to store and carry the work items.

4,874,120

CARGO TRANSPORTING CARRIER

Eric R. Paton, and William U. Cooley, both of 2635 Beland, Redondo Beach, Calif. 90278

Filed Nov. 24, 1986, Ser. No. 933,983
Int. Cl.[4] A63C 15/06; A45F 5/00
U.S. Cl. 224—266 14 Claims



1. An arrangement for transporting cargo adapted to be placed on the upper surface of both shoulders of a user with the users head positioned below the cargo a sufficient distance to allow the head of the user mobility, comprising, in combination:

a bed means, having a surface upon which said cargo may be loaded, having a plurality of horizontal support members, each having a front end and a rear end, and a plurality of bed cross members each having a right end and a left end and attached to said horizontal support members whereby said bed means has a right front portion, a left front portion, a right rear portion and a left rear portion and a left most and a right most horizontal support member;

a plurality of vertical support members each having a first and a second end and at least the first of said plurality of vertical support members attached at a preselected angle by said first end to said right front portion, at least the second of said plurality of vertical support members attached at a preselected angle by said first end to said left front portion, at least the third of said plurality of vertical support members attached at a preselected angle by said first end to said right rear portion and at least the forth of said plurality of vertical support members attached at a preselected angle by said first end to said left rear portion of said bed means whereby said plurality of vertical support members support said bed means above the head of the user;

a plurality of support cross members each having a first end and second end;

at least the first of said plurality of support cross members attached by said first end to a preselected portion of said at least first vertical support member attached to said right front portion of said bed means and attached by said second end to a preselected portion of said at least second vertical support member attached to said left front portion of said bed means;

at least a second of said plurality of support cross members attached by said first end to a preselected portion of said at least third vertical support member attached to said right rear portion of said bed means and attached by said second end to a preselected portion of said at least fourth vertical support member attached to said left rear portion of said bed means;

whereby said plurality of support cross members keep said plurality of vertical support members in a fixed preselected relation;

a left shoulder support means having an upper and a lower surface, said upper surface connected to said second end

of said at least second vertical support member attached to said left front portion of said bed means and connected to said second end of said at least forth vertical support member attached to said left rear portion of said bed means;

a right shoulder support means having an upper and a lower surface, said upper surface connected to said second end of said at least first vertical support member attached to said right front portion of said bed means and connected to said second end of said at least third vertical support member attached to said right rear portion of said bed means;

a right handle mounted on the front most of said at least first vertical support member attached to said right front portion of said bed means; and

a left handle mounted on the front most of said at least second vertical support member attached to said left front portion of said bed means.

4,874,121

WEB FEED TRACTOR BELT ASSEMBLY

Bernard Rubinshtein, Spokane, Wash., assignor to Output Technology Corporation, Spokane, Wash.

Filed May 3, 1988, Ser. No. 189,521
Int. Cl.[4] G03B *1/30*
U.S. Cl. 226—74 **14 Claims**

1. A web feed tractor mechanism for feeding a web in a longitudinal path in which the web has circular feed perforations of a prescribed inside diameter formed in parallel edge sections along the side edges of the web, comprising:

a pair of edge drive belts having drive pins thereon adapted to project into the feed perforations in which one of the drive belts has a first set of projecting pins and the other drive belt has a second set of projecting pins;

drive means for supporting the edge drive belts substantially parallel with each other along corresponding edge sections of the web and for synchronously driving the belts to move the drive pins into the perforations and to move the web forward in the longitudinal direction;

wherein each of the first set of pins of one of the belts has a tapered front surface, a tapered rear surface, a tapered left side surface and a tapered right side surface extending outward from a base of the first pin, in which the diametrical distances between the front and rear surfaces and the left side and right side surfaces at the base are substantially equal the prescribed inside diameter of the feed perforations for driving the web in the longitudinal direction and stabilizing the web in the lateral direction to prevent lateral movement of the engaged edge section relative to the one belt;

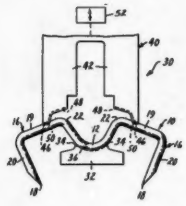
wherein each of the second set of pins of the other belt have a reduced cross-section at its base with a tapered front surface, a tapered rear surface, a tapered left side surface and a tapered right side surface in which the diametrical distance between the front and rear surfaces at their bases substantially equals the prescribed inside diameter of the perforations to engage the inside edge of the perforation for driving the web in the longitudinal direction and wherein the diametrical distance between the left side surface and the right side surface at their bases is substantially less than the prescribed inside diameter of the perforations to form a lateral gap between at least one of the side surfaces and the inside edge of the perforations to accommodate laterally misalignments and inaccuracies to minimize lateral tension on the web.

4,874,122

BENT BACK BOX STAPLE AND STAPLE CLOSING MECHANISM WITH SPLIT ACTUATOR

Harold E. Froelich, Minn., and Floyd L. Foslien, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 885,221, Jul. 14, 1986, abandoned. This application Aug. 25, 1988, Ser. No. 238,972
Int. Cl.[4] B25C *5/06*; A61B *17/04*
U.S. Cl. 227—19 **8 Claims**



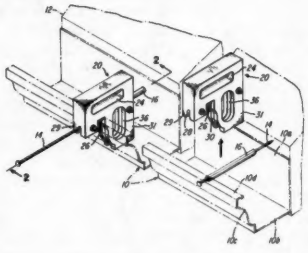
1. An unused open wire staple for suturing living tissue, said open staple comprising a generally U-shaped central portion having opposite ends and at least one arcuate part; and outer portions terminating in sharp points, said outer portions each comprising a generally straight proximal part and a generally straight distal part with said parts disposed at about a right angle to each other and with said sharp point being on the end of said distal part opposite said proximal part, and the end of said proximal part opposite said distal part being disposed at about a right angle to and connected to one end of said central portion, said staple being closable by bending generally straight the arcuate part of said central portion adjacent each of said outer portions so that said outer portions can enter and gather living tissue, during such closure the sharp points on said distal parts moving to adjacent positions with said distal parts generally aligned with each other to provide a generally rectangular closed staple, and the central portion of the closed staple subsequently being bendable to retract the outer portions of the staple from the living tissue, the distal parts having a length sufficiently greater than the length of the central portion that the sharp points of the outer portions overlap when the staple is closed.

4,874,123

GUTTER INSTALLATION TOOL

Roger W. Mercer, II, Rte. 2, Box 236, Marshall, Va. 22115, and Roger W. Mercer, 1340 Arlington Dr., Fairborn, Ohio 45324

Filed Nov. 17, 1988, Ser. No. 272,348
Int. Cl.[4] B25C *1/02*
U.S. Cl. 227—147 **3 Claims**



1. A gutter installation tool for positioning on a gutter being installed onto a building portion and detachably holding and

positioning a gutter nail and gutter ferrule, said gutter installation tool comprising; a handle having means thereon for locating against a portion of said gutter, and further having means thereon for detachably holding and positioning a gutter ferrule within said gutter and means thereon for detachably holding and positioning a gutter nail outside of said gutter to be in substantial coaxial longitudinal alignment with said ferrule, said installation tool being detachable after said nail has been partially driven into said building portion.

4,874,124

PROCESS FOR CARRYING OUT THE SOLDERING OF ELECTRONIC COMPONENTS ON A SUPPORT

Ken W. E. Johns, Ashford; Stuart Briggs, Richmond, both of England, and Luciano Fiabbi, Milan, Italy, assignors to Montedison S.p.A., Italy

Continuation of Ser. No. 836,144, Mar. 4, 1986, abandoned. This application Jan. 26, 1988, Ser. No. 149,979
Claims priority, application Italy, Mar. 6, 1985, 19790A/85
Int. Cl.[4] B23K *31/02*; C09K *5/00*
U.S. Cl. 228—180.1 **12 Claims**

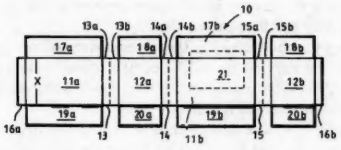
1. A process for bonding electronic components to a support, the process consisting essentially of arranging said components on the support together with a bonding material, and then placing the thus-obtained assembly in contact with a perfluoropolyether in the liquid state having a temperature equal to or greater than the temperature at which said bonding material develops its binding properties, said perfluoropolyether having a molecular weight exceeding 5000.

4,874,125

FOLDING CORRUGATED BOARD CARTON

Howard M. Bates, Forest Hills, N.Y., assignor to CALPAC Incorporated, Uniondale, N.Y.

Filed Sep. 12, 1988, Ser. No. 243,328
Int. Cl.[4] B65D *5/02*
U.S. Cl. 229—132 **10 Claims**



1. A rigid folding carton suitable for the shipping of goods and their point-of-purchase display which is formed from a one-piece blank of corrugated board, which blank comprises:

a) at least three closure-forming wall panels each possessing a length dimension and each possessing an identical height dimension, the exterior surface of each wall panel being continuously flat for substantially its full expanse, the first and last of said wall panels in the series each terminating in a foldable extension panel which is substantially coextensive with the height of the panel, each wall panel being joined to a successive wall panel in the series through a foldable bridging panel which is substantially coextensive with the height of the thus-joined wall panels; and,

b) at least one closure flap hingedly connected to the top or bottom of one of said wall panels, the exterior surface of the closure flap being continuously flat for substantially its full expanse,

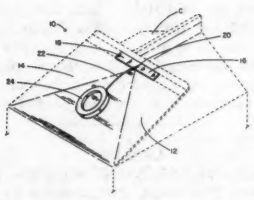
such that in the assembled condition of the carton, the foldable extension panel of the first wall panel is folded 180° and joined to the wall panel of which it is an extension, the foldable extension panel of the second wall panel is folded at an angle which is equal to 360° divided by the number of wall panels and as folded, is joined to the free surface of the folded extension panel of the first wall panel to form an internal vertical corner gusset element which is substantially coextensive with the height of the wall panels and each bridging panel joining successive wall panels is folded into subpanels which are joined to each other and to a portion of an adjacent wall panel to provide another internal vertical corner gusset element which is substantially coextensive with the height of the wall panels, the total number of said internal corner gusset elements being equal to the total number of wall panels, said internal vertical corner gusset elements imparting substantially increased vertical crush strength to said carton compared to a carton of the same dimensions and same grade corrugated board lacking vertical corner gusset elements.

4,874,126

CONTAINER OPENING DEVICE

Lawrence G. Miller, 5615 Barna Ave., Titusville, Fla. 32780

Filed Mar. 29, 1989, Ser. No. 329,966
Int. Cl.[4] B65D *5/44*
U.S. Cl. 229—160.2 **8 Claims**



1. In a carton formed from a semi-rigid paper board material and having an initially closed dispensing opening formed by a pair of overfolded flaps joined at a central apex, the improvement comprising:

a strip securled to said carton and extending between said flaps and having a central folding joint disposed at said central apex;

a cord having a first end secured at central point of said strip; and

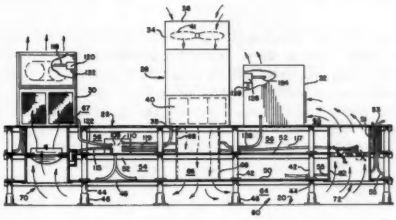
grasping means at an opposite end of said cord whereby said dispensing opening may be opened by pulling said grasping means.

4,874,127

CLIMATE CONTROL APPARATUS

William R. Collier, 1 S. 141 Spring Rd., Oakbrook Terrace, Ill. 60181

Filed Nov. 12, 1987, Ser. No. 119,805
Int. Cl.[4] F24F *13/10*
U.S. Cl. 236—49.5 **5 Claims**



1. A climate control apparatus for disposition within a building room interior, said apparatus comprising, in combination,

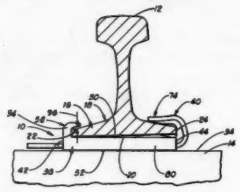
an access floor assembly disposed within said building room interior, said access floor assembly including an uppermost working area floor lying above and spaced apart from a building floor in said room interior, said access floor assembly further including at least one intermediate floor lying between said working area floor and said building floor so as to define, at least in part, at least one a wireway region between said intermediate floor and said work area floor and an HVAC main plenum space between said building floor and said intermediate floor, at least one plenum inlet extending between a conditioned air source outside said main plenum space and the interior of said main plenum space, and a plurality of plenum outlet stacks extending vertically through said at least one wireway region and between said main plenum space and a plenum outlet area above said working area floor, a control damper unit disposed in each of said plenum outlet stacks, means for adjusting each of said control dampers so as to increase or decrease air flow therethrough, a temperature sensing element disposed adjacent each of said plenum outlet areas and lying above said working area floor, a control unit adapted to communicate with and control the output of an associate HVAC unit, said control unit being operatively connected to each of said temperature sensing units, each of said control dampers, and said HVAC unit, whereby said HVAC unit may controlled so as to provide sufficient conditioned air for said room interior as a whole, and whereby each of said control dampers may permit air flow therethrough as needed to provide a desired air temperature in the vicinity its associated plenum outlet area in said working area floor.

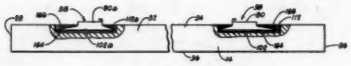
4,874,128

RAIL-TIE FASTENING ASSEMBLY

S. Hudson Owen, Marshfield, Wis., assignor to Kerr-McGee Chemical Corporation, Oklahoma City, Okla.

Filed Dec. 3, 1987, Ser. No. 128,174
Int. Cl.[4] E01B 2/00, 9/00
U.S. Cl. 238—355 66 Claims





22. A rail-tie fastening assembly for connecting a rail having a rail flange with an upper surface, a lower surface, a first side and a second side to a tie having an upper surface, comprising:

a rail seat assembly connectable to the upper surface of the tie having a first end, a second end, a first side, a second side, an upper surface and a lower surface, a seat hook assembly being formed on the rail seat assembly generally near the first end of the rail seat assembly and being adapted to engage the first side of the rail flange and to extend a distance generally over a portion of the upper surface of the rail flange generally near the first side of the rail flange, the seat hook assembly being spaced a distance from the upper surface of the rail flange; and

a rail anchor having a first side, a second side, a first end and a second end, an anchor hook assembly being formed on the rail anchor generally near the second end of the rail anchor, a portion of the anchor hook assembly being adapted to extend a distance generally over and engage a portion of the upper surface of the rail flange generally near the second side of the rail flange and a portion of the anchor hook assembly being engageable with the second side of the rail flange, the rail anchor being connectable to the rail seat assembly in an assembled position to permit limited vertical movement of the anchor hook assembly and portion of the rail flange engaged thereby.

29. A rail-tie fastening assembly adapted for use with a rail having a rail flange, comprising:

a tie having an upper surface with cavity means formed in a portion thereof of the upper surface;

a base anchor means disposed in the cavity means in the tie after the cavity means has been formed in the tie, the cavity means having a sufficient size whereby the base anchor means is disposable within the cavity means;

means for connecting the base anchor means to the tie, comprising;

compound means disposed in the cavity means whereby the compound means covers at least a portion of the portion of the base anchor means disposed in the cavity means and whereby the compound means substantially fills the portion of the cavity means not occupied by the base anchor means and cooperates to secure the base anchor means in the cavity means.

means connected to the base anchor means and connectable to the rail flange for connecting the rail to the tie via the base anchor means.

62. A method for connecting a rail having a rail flange with an upper surface, a lower surface, a first side and a second side to a tie having a first end, a second end and an upper surface, using a pair of rail seat plates wherein each rail seat plate is connected to a base anchor means and a rail anchor, comprising the steps of:

forming a first cavity in the upper surface of the tie, generally near the first end of the tie;

forming a second cavity in the upper surface of the tie generally near the first end of the tie, the second cavity extending generally parallel with the first cavity and being spaced a distance therefrom;

disposing the base anchor means having the first rail seat plate connected thereto the first cavity in the tie, the first cavity being sized with respect to the base anchor means connected to the first rail seat plate so that the first seat plate is disposed generally on the upper surface of the tie when the base anchor means with the first rail seat plate connected thereto is disposed in the first cavity;

securing the base anchor means with the first rail seat plate connected thereto in the cavity;

disposing the base anchor means having the second rail seat plate connected thereto in the second cavity in the tie, the second cavity in the tie being sized with respect to the base anchor means connected to the second rail plate so that the second rail plate is disposed generally on the upper surface of the tie when the base anchor means with the second rail seat plate is connected thereto is disposed in the first cavity; and

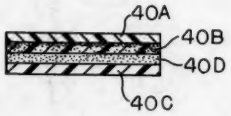
securing the base anchor means with the second rail seat plate connected thereto in the second cavity, the first rail seat plate and the second rail seat plate each being sized and positioned in the respective first and second cavities so that a space is formed between the first and the second rail seat plates defining an anchor slot, the rail anchor being movable through a portion of the anchor slot for connecting the rail anchor to the first and the second rail slot plates.

4,874,129

MULTI-LAMINATE FRAGRANCE RELEASE DEVICE

Alfred J. DiSapio, Greenwich, Conn.; William R. Pfister, Bay City, and Mary A. Sheeran, Midland, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Jun. 30, 1988, Ser. No. 213,738
Int. Cl.[4] A61L 9/12
U.S. Cl. 239—36 22 Claims



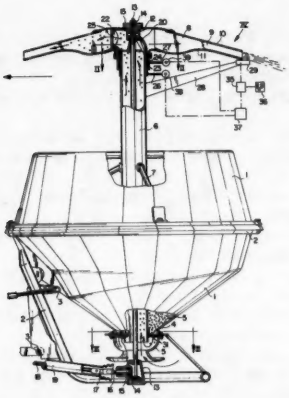
1. A multi-layered multi-laminate sustained release device capable of releasing fragrances at a controlled rate for a prolonged period of time comprising a first layer of a pressure sensitive adhesive release liner for providing a protective peel strip for the device, a second layer of a silicone pressure sensitive adhesive for adhering the device to a substrate to which it is applied, a third layer of a fragrance impregnated matrix which is a silicone material selected from the group consisting of silicone elastomers, silicone elastomers having adhesive characteristics, and elastomeric silicone pressure sensitive adhesives, a fourth layer of a permeable facestock backing member on the surface of the device for controlling the rate of release of the fragrance from the impregnated matrix, the fragrance in the impregnated matrix constituting of from about one-half of one percent to about forty percent by weight of the impregnated matrix, the matrix including a release rate modifying excipient for increasing the solubility of the fragrance in the matrix resulting in an increase in the release capability of the device.

4,874,130

DEVICE FOR DISTRIBUTING A GRANULAR OR POWDERY SUBSTANCE

Jan Wondergem, Rijsenhout, Netherlands, assignor to Multinorm B.V., Netherlands

Filed Jun. 23, 1987, Ser. No. 65,588
Claims priority, application Netherlands, Jun. 23, 1986, 8601629
Int. Cl.[4] A01C 15/14, 17/00
U.S. Cl. 239—63 16 Claims



1. A device for distributing a granular or powdery substance such as fertilizer, comprising a storage holder for this substance having out flow opening means for flowing the substance therethrough, one or more elevated distributor members, a vertically extending guide tube having a lower end communicating with the outflow opening means and an opposite end communicating with each distributor member, means for generating an air flow from the lower end of the guide tube located at said outflow opening means to the opposite end of said tube, and means for controlling flow of the substance through the outflow opening means between open and shut-off conditions, including sensors arranged close to the discharge path of the distributor member for determining the width and direction of spread of the substance for distribution.

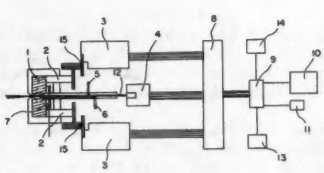
2. A device for distributing particulate material from an elevated position over the surface of a field which comprises the combination of storage means for containing a supply of the particulate material and having bottom opening means for controllably discharging the particulate material in a direction to flow directly downwardly onto the surface of a field, means for transporting the device along a path on the field to produce a swath of coverage of the particulate material over the surface of the field, distribution means leading from the bottom opening means of the storage means upwardly to a region of discharge located at the elevated position above the storage means for directing material in a generally horizontal direction at said elevated position to create the swath of coverage, said distribution means comprising a conduit having an open bottom end in communication with ambient air and the bottom opening means of the storage means, and rotatable suction means communicating with the conduit at the elevated position above the the bottom end of the conduit for sucking air to flow from the bottom end of the conduit upwardly through the conduit to pick up particulate material discharging through the bottom opening means and entrain such particulate material in the air flow and discharge the air and material entrained in it at the elevated position to create the swath of coverage, said suction means constituting the sole mechanism for conveying the material to said elevated position.

4,874,131

COLOR DOSIFICATION/APPLICAION MACHINE

Francisco B. Sanchez-Robles, and Maria De La Paloma M. Manterola, both of C/Calixto III no. 51 32a, 46008 Valencia, Spain

Filed May 20, 1987, Ser. No. 51,643
Claims priority, application Spain, May 23, 1986, 555270
Int. Cl.[4] B05B 7/00
U.S. Cl. 239—307 7 Claims



1. A color dosification and application machine comprising:
a rotary cutter, said rotary cutter having a face plane and an internal plane;
a drive element for rotating said rotary cutter; and
a plurality of blades, each of said blades emerging in an oblique position from said rotary cutter and forming a helical channel in said rotary cutter, said helical channel being between said face plane and said internal plane whereby color pigment bars are engaged during said rotating of said rotary cutter at a periphery of said blades and are converted into powder, said powder being transported from said periphery of said blades to an axially

positioned needle having a central nozzle wherein said powder is mixed with pressurized air and fluid emerging through said nozzle.

4,874,132

DRIP IRRIGATION APPARATUS

Gideon Gilead, P.O.B. 26025, Jerusalem, Israel

Continuation of Ser. No. 157,838, Jun. 9, 1980, abandoned. This application Aug. 12, 1983, Ser. No. 522,728

Claims priority, application Fed. Rep. of Germany, Jun. 19, 1979, 2924708

Int. Cl.[4] B05B *15/00*

U.S. Cl. 239—542 **22 Claims**

1. Drip irrigation apparatus comprising an elongated element of uniform cross-section including:

a seamless leak resistant extruded closed portion defining first and second generally parallel and uniformly spaced main surfaces having a first cross-sectional extent and first and second side surfaces integrally joined to said first and second main surfaces and having a second cross sectional extent less than said first cross sectional extent, said seamless closed portion defining a volume therewithin; and

at least one solid portion integrally formed therewith with said seamless closed portion and extending outwardly from at least one of said first and second side surfaces,

said elongated element defining parallel side edges, said parallel side edges being joined to define a water supply channel having said extruded closed portion extending only over part thereof,

at least one of said first and second main surfaces of said seamless extruded closed portion being embossed thereby defining adjacent portions of said first and second main surfaces at selected locations thereon,

said first and second main surfaces being joined to each other at said selected locations at which at least one of said first and second main surfaces are embossed to define a pressure reducing pathway at locations wherein neither of first and second main surfaces are embossed or joined to each other, said pathway having a multiplicity of bends and turns and communicating with said water supply channel;

and also comprising a water outlet permitting exit of water from said pressure reducing pathway.

4,874,133

GAS SUPPLY AND DISTRIBUTION CENTER

Hans-Gerd Gethke, Auf der Höhe 4, D-5107, Steckenborn, Japan; Detlef Eitner, Grunenthal 12, D-5100, Aachen, Japan, and Friedel Engelhard, Aiselsfeld 7, D-5204, Lohmar 21, Japan

Continuation of Ser. No. 177,240, Apr. 4, 1988, abandoned, which is a division of Ser. No. 028,417, Mar. 20, 1987, Pat. No. 4,786,297. This application Oct. 17, 1988, Ser. No. 259,410

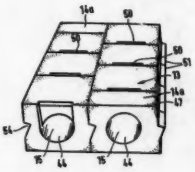
Claims priority, application Fed. Rep. of Germany, Oct. 9, 1986, 3634377

The portion of the term of this patent subsequent to Nov. 22, 2005, has been disclaimed.

Int. Cl.[4] B05B *1/14*

U.S. Cl. 239—555 **11 Claims**

1. A gas duct comprising at least two blocks each having opposite first and second faces, the first and second faces of adjacent blocks being in abutment with each other, a gas channel in each block extending between the first and second faces thereof, said gas channels being in fluid communication with each other, each block having an upper surface, a recess in each block first face extending between the associated gas channel and the upper surface thereof thereby defining with the adjacent block second face a gas exit aperture, each block includes opposite third and fourth faces provided with respective complementary contoured projections and recesses adapted to interdigitate adjacent gas ducts, each gas channel being defined by an interior peripheral surface of a predetermined peripheral configuration having a maximum transverse



dimension as defined by a transverse plane through each gas channel, and each recess and gas exit aperture having a transverse size at least equal to said maximum transverse dimension whereby a substantial portion of each gas channel is exposed directly to atmosphere through its associated recess and gas exit aperture.

4,874,134

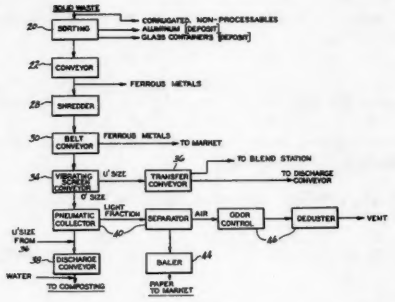
SOLID WASTE PROCESSING FACILITY AND PROCESS

Thomas J. Wiens, 455 Westwood, Denver, Colo. 80206

Filed Jul. 18, 1988, Ser. No. 220,791

Int. Cl.[4] B02C *21/00*

U.S. Cl. 241—19 **23 Claims**



1. A process for treating solid waste materials and forming a compost from a biodegradable waste material fraction, said process comprising:

receiving untreated solid waste material at a receiving station;

manually removing bulky valuables, non-processable materials and redeemable materials from said untreated waste material;

said removing step including manually removing plastic and non-ferrous materials;

magnetically separating a first ferrous metal fraction from said waste material;

comminuting said waste material after separating out said first ferrous metal fraction;

magnetically separating a second ferrous metal fraction from said comminuted waste material;

pneumatically separating a paper fraction in a dry state from said comminuted waste material leaving a substantially biodegradable fraction; and

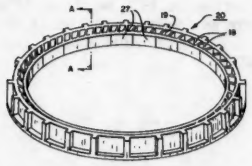
forming a compost from said substantially biodegradable fraction.

4,874,135

MILL THROAT FOR PULVERIZER

Robert S. Provost, Suite 283, 6393 Penn Ave., Pittsburgh, Pa. 15206

Filed Dec. 29, 1988, Ser. No. 290,377
Int. Cl.[4] B02C *15/06*
U.S. Cl. 241—57 4 Claims



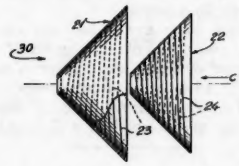
1. In a coal pulverizer of generally cylindrical shape and vertical central axis and having a mill assembly which thrusts pulverized coal centrifugally from the mill and a source of forced air to propel a mixture of the so-thrust coal and air vertically to classifier means and subsequently to a combustion zone; a throat ring surrounding the said mill the throat mill being uniformly composed of a plurality of angularly disposed vertical channels through which the air is upwardly passed, each said channel having an exit port over which pulverized coal is passed, each said exit port being of essentially greater cross-section than the cross-section of that remainder of each corresponding channel extending beneath the exit port and being formed by a convex outer diameter exit bevel coterminous with the upper surface of the throat ring.

4,874,136

PULP REFINING APPARATUS

David R. Webster, 32 Forden Avenue, Westmount, Quebec, Canada H3Y 2Y8

Continuation of Ser. No. 895,749, Aug. 12, 1986, abandoned, which is a continuation of Ser. No. 629,560, Jul. 10, 1984, abandoned, which is a continuation of Ser. No. 311,251, Oct. 14, 1981, abandoned. This application Jan. 22, 1988, Ser. No. 148,167
Claims priority, application Canada, Sep. 30, 1981, 387,006
Int. Cl.[4] B02C *7/12*
U.S. Cl. 241—251 4 Claims



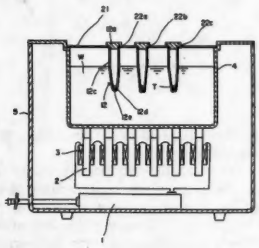
1. In a high speed pulp refiner having a pair of refiner members having opposed surfaces defining a gap, each member formed with alternating grooves and lands extending continuously between a central port and a peripheral port through which a pulp slurry flows, the edges of the lands defining work edges, the direction of the work edges on one surface being opposite to the direction of work edges on the opposed surface forming intersections therewith, drive means for rotating at least one of the members relative to the other, the grooves and lands defined in the at least one member extending from the one of the central and peripheral ports to the other of said ports in a spiral pattern of at least one revolution having a direction on the member from one port to the other which is opposite to the direction of rotation such that as the at least one member rotates, the intersections will move downstream which will provide a screw pump action to the pulp slurry as it advances from one port to the other, the pitch of the spiral lands forming the work edges on the opposed surfaces of the respective refiner members being such that each of the intersections of the opposed work edges defines an obtuse angle on the downstream side of the lands relative to the direction of rotation and pulp slurry flow such that the pulp fibers suspended in the pulp slurry will be subjected to a pinching action.

4,874,137

ULTRASONIC CELL-DESTROYER

Shigeru Chiba, WACORE Yoshino-cho Garden 110, 319-3 Nakamura-cho 5-chome, Minami-ku, Yokohama-shi, Kanagawa-ken, Japan

Filed Nov. 14, 1988, Ser. No. 270,217
Claims priority, application Japan, Aug. 1, 1988, 63-192223
Int. Cl.[4] B02C *19/18*
U.S. Cl. 241—301 7 Claims



1. An ultrasonic cell-destroyer comprising at least one closed container 12 comprising a container body 12*c* and a closure 12*a* for containing a given quantity of liquid T in which cells to be destroyed are suspended, and a vessel 4 equipped with ultrasonic wave generator means at its bottom so as to destroy cells in the container 12, which is partly soaked in the bath W of the vessel 4, characterized in that the container body 12*c* has an upward converging or concave groove 12*e* on its bottom 12*d*.

4,874,138

ROTARY TRANSMISSION DEVICE FOR A PLURALITY OF CABLES BETWEEN TWO RESTRICTEDLY ROTATABLE STRUCTURES

Günther Kettenring, Freising, Fed. Rep. of Germany, assignor to Max-Planck-Gesellschaft zur Foerderung der Wissenschften e.V., Goettingen, Fed. Rep. of Germany

Filed Apr. 18, 1988, Ser. No. 182,933
Claims priority, application Fed. Rep. of Germany, Apr. 22, 1987, 3713506
Int. Cl.[4] H02G *11/06;* B64G *1/42*
U.S. Cl. 242—54 R 11 Claims

1. A rotary transmission device for a plurality of cables between two coaxial, rotatable structures comprising:

two spaced apart plates, between which at least one support band is arranged said support band being laid perpendicular to the plates along a spiral, thereby forming spiral windings, the support band having a first end fastened at the one structure and a second end fastened at the other structure,

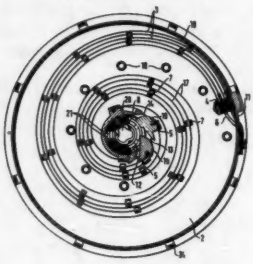
a plurality of electrical cables laid along the outer side of said support band,

a plurality of fastening devices distributed along the support band in spaced apart relation for fastening said electrical cables to said support band,

means for slidably mounting said support band with respect to said plate,

wherein one of said structures is provided with a cylindrical

housing comprising a cylindrical wall, a bottom and a cover, the bottom and the cover being formed by said plates, said other structure comprising a substantially cylindrical hollow hub concentrically extending into said housing, and wherein the support band is secured at its ends to the wall of the housing and at the hollow hub, respectively, said ends extending tangentially to the wall and the hub, at least one axial passage slit for the cables being formed in said hub,



wherein the cables are laid in a wavelike course along the support band, and

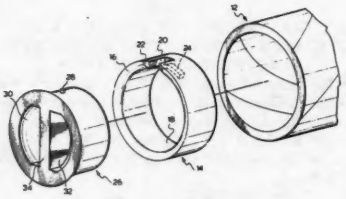
wherein said fastening devices fixedly fasten said cables to the support band at every second apex of the wavelike course and retain said cables at every other apex of the wavelike course, said fastening devices providing radial and axial clearances with respect to the spiral at said every other apex.

4,874,139

TUBULAR CORE ASSEMBLIES FOR ROLLS OF PAPER OR OTHER SHEET MATERIAL

Daniel Kewin, 16 Dogwood Drive, Brantford, Ontario, Canada N3R 1R3

Filed Oct. 31, 1988, Ser. No. 264,656
Int. Cl.[4] B65H *75/18*
U.S. Cl. 242—68.6 **6 Claims**



1. A tubular core assembly for a roll of paper or other sheet material comprising:

a hollow cylindrical core member formed by multiple wraps of paperboard material,

an annular collar within each opposite end portion of the core member, each collar being a rigid body of non-isotropic material and having an outer annular surface glued to the inner annular surface of the core member and an inner annular surface having a configuration complementary to the outer annular surface of a roll supporting chuck so that the chuck is receivable therein with a close fit and

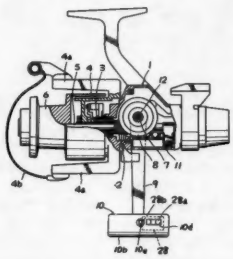
a pair of plugs insertable into the collars at opposite ends of the tublar core assembly, each plug comprising a body of non-isotropic material with a solid cross-section having an uninterrupted circular outer circumference, each plug having a length substantially equal to the length of the collar, and each plug having an outer annular surface complementary to that of the internal annular surface of the collar so as to be a close fit therein.

4,874,140

FISHING REEL

Yasuhiro Hitomi, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Oct. 26, 1988, Ser. No. 262,706
Claims priority, application Japan, Oct. 31, 1987, 62-276407
Int. Cl.[4] A01K *89/01*
U.S. Cl. 242—223 **4 Claims**



1. A fishing reel, comprising:

a reel body;

a spool supported relative to said reel body;

a handle rotatably mounted on said reel body for winding up a fishing line on said spool;

a grip shaft fixed to a free end of said handle;

a grip rotatably supported relative to said grip shaft and comprising a cavity;

a counter means, responsive to rotation of said grip shaft relative to said grip, for counting a number of complete revolutions of said grip shaft relative to said grip when said handle rotates and providing an output representing said number of revolutions, said counter means being housed in said cavity;

a converter means, receiving said output representing said number of revolutions from said counter means, for converting said number of revolutions into a length of said wound fishing line; and

a display means, responsive to said converter means, for displaying an indication of said length, said display means being disposed on an exterior surface of said grip, such that, when said handle is rotated to wind-up said fishing line on said spool, said display means on said grip displays said indication of said length of said wound fishing line.

4,874,141

FREEZER BAG SUPPORTING STAND

Richard H. Schulz, 845 N. L Street, Livermore, Calif. 94550

Continuation-in-part of Ser. No. 126,640, Nov. 30, 1987, abandoned. This application Nov. 29, 1988, Ser. No. 277,202
Int. Cl.[4] A63B *55/04*
U.S. Cl. 248—97 **4 Claims**

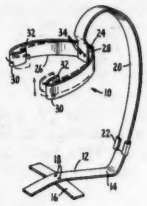
1. A stand for supporting bags comprising:

a base, said base being generally horizontally oriented;

a stanchion connected to said base, said stanchion being J-shaped having one end thereof extending into a bag to be supported, said stanchion being generally curved along the length thereof and being flexible and capable of arcing and bending; and

a bag-engaging collar which is generally C-shaped and generally horizontally oriented and connected to said stanchion, said collar having a center section interconnected

with said stanchion and ends, movement of said ends by hand manipulation inwardly toward each other allowing insertion of said collar within the mouth of a bag to be supported, said collar opening outwardly to engage the inside of a bag to be supported, loading of a bag arcing and bending said stanchion gradually upon loading, said collar



remaining generally horizontal to avoid spillage, said collar and the bending of said stanchion by arcing maintaining a bag in column and supporting a bag primarily upon said base, movement of said ends and spring-back of said stanchion allowing easy removal of said collar from a loaded bag.

4,874,142

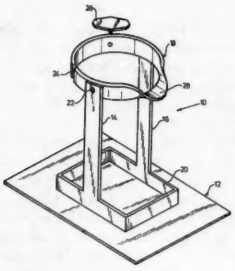
BLOW DRYER HOLDER

Sharon G. Gelatt, 9 N. Kern Ave., Woodland, Calif. 95695

Filed Nov. 25, 1988, Ser. No. 275,918

Int. Cl.[4] F16M *11/10*

U.S. Cl. 248—185 **1 Claim**



1. An appliance holder for holding a blow dryer, comprising:

a support base;

an upstanding tray on said support base for storing miscellaneous accessory items;

a pair of spaced parallel upstanding support arms connected to opposite side wall portions of said tray;

a cylindrical support ring;

means mounting aid support ring for pivotal adjustment between said support arms;

a thumb screw threadably received through said support ring for selective frictional engagement with a blow dryer;

a gap formed in a cylindrical side wall of said support ring, said gap serving to permit an electric cord to be positioned therethrough during insertion of a blow dryer within said support ring;

and

a longitudinally extending support member forming a part of said support ring, said support member providing additional stability to said blow dryer when said blow dryer is retained within said support ring, said support member positioned substantially opposite from said thumbscrew, whereby said thumbscrew forces said blow dryer into engagement with said support member.

4,874,143

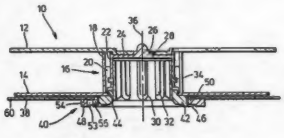
TAPE CASSETTE HAVING REWIND CONTROL MECHANISM

Richard J. Armstrong, and Robert Granzotto, both of Toronto, Canada, assignors to Arena Recreations (Toronto) Limited and William L. Heisey, both of Toronto, Canada

Filed Jun. 9, 1988, Ser. No. 204,564

Int. Cl.[4] G11B *23/087*

U.S. Cl. 242—198 **8 Claims**



1. In a tape cassette having a housing and a pair of spools located in the housing, a first of said spools being a take-up spool which is mounted in the housing for rotation about its axis in a first direction to wind and a second direction to unwind a tape or the like from or onto the other spool, the improvement of;

(a) an engagement member mounted in the housing for rotation about the axis of the take-up spool,

(b) one-way coupling means arranged to communicate between the engagement member and the take-up spool, said coupling means engaging automatically to prevent rotation of the spool relative to the engagement member in the unwinding direction and releasing automatically to permit free rotation of the spool relative to the engagement member in the winding direction,

(c) locking means in said housing, said locking means being operable to engage said engagement member to secure it against rotation about the axis of the take-up spool and thereby prevent rotation of the take-up spool as a result of the automatic engagement of the coupling when an attempt is made to rotate the take-up spool relative to the engagement member in the unwinding direction and to disengage the engagement member to permit free rotation of the engagement member and spool about its second axis to allow the spool to be rewound.

4,874,144

BAIL FOR SPINNING REEL

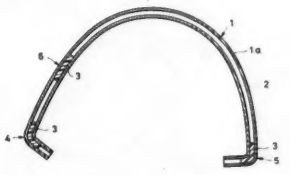
Hideo Murakami, Hiroshima, Japan, assignor to Ryobi, Ltd., Hiroshima, Japan

Filed Sep. 21, 1987, Ser. No. 98,957

Claims priority, application Japan, Sep. 22, 1986, 61-1453[U]

Int. Cl.[4] A01K *89/01*

U.S. Cl. 242—235 **4 Claims**



1. A fishing reel bail assembly for mounting on a rotor of a fishing reel, comprising a hollow arcuate metallic tube having

first and second ends, means including the first and second ends for attachment to bail support arms of the fishing reel rotor, and synthetic resin disposed at a plurality of predetermined locations within the tube between the first and second ends for reinforcing said tube.

4,874,145

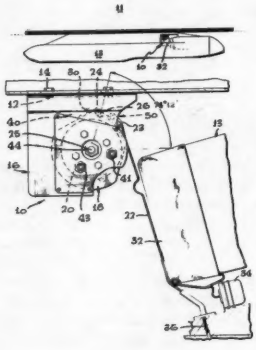
MISSILE AIR INLET COVER RETRACTOR SYSTEM

Robert J. Prentice, El Segundo, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 27, 1986, Ser. No. 923,450

Int. Cl.[4] B64D *1/04*

U.S. Cl. 244—53 B **14 Claims**



1. In a system useable for launch of missiles from a transporting aircraft, article retraction apparatus comprising:

a housing detachably mounted on said aircraft, said housing having a recess for containment of articles retracted from said missile during or immediately prior to launch;

a rotor contained within said housing, said rotor being spring driven and coupled to said article by flexible retractor means;

adjustment means for controlling said spring driven rotor in tension and total travel; and

means for initiating operation of said retraction apparatus.

4,874,146

STEERABLE KITE

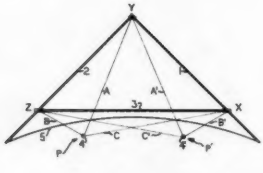
Edmund Heid, Togostrasse 72, D-1000 Berlin 65, Fed. Rep. of Germany

Filed Sep. 19, 1988, Ser. No. 256,679

Claims priority, application Fed. Rep. of Germany, Sep. 18, 1987, 87126133[U]

Int. Cl.[4] B64C *31/06*

U.S. Cl. 244—153 R **11 Claims**



4. A steerable kite, comprising:

(a) first and second lateral members secured to each other at adjacent ends;

(b) a cross-member secured at a first end to the first lateral member and at a second end to the second lateral member;

(c) a means for covering a region located between the first lateral member and the second lateral member; and

(d) a means for controlling the kite;

wherein the lateral members, the cross-member, and the covering means form a single chamber system.

4,874,147

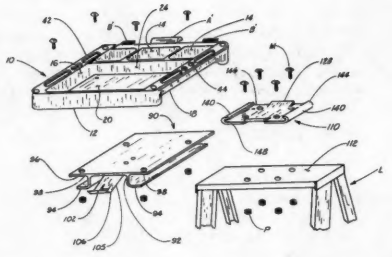
TRAY AND TOOL HOLDER ADAPTABLE TO STEPLADDERS

Raymond J. Ory, 7 N. Parkway Dr., and Paul Smeltzer, 8 N. Parkway Dr., both of Naperville, Ill. 60540

Filed Apr. 14, 1988, Ser. No. 181,677

Int. Cl.[4] E06C *7/14*

U.S. Cl. 248—210 **5 Claims**



1. A tool and small parts utility tray with mounting plates comprising:

a rectangular tray having four exterior corners formed by the intersection of two lateral and two longitudinal exterior walls, a floor panel and interior wall elements defining open upwardly facing recessed compartments adapted to receive a closure plate hingedly attached to an upper edge of a lateral exterior wall, lateral outwardly extending flange elements attached to oppositely facing longitudinal exterior wall portions, open ended cylindrical vertical bearing surfaces formed and defined by surrounding wall portions rotatably received within said vertical bearing surfaces a shaft having a castor wheel assembly attached thereto, mounting plates comprising: an upper and a lower mounting plate for readily attaching and detaching said utility tray to a supporting surface; said upper mounting plate is rectangular in shape having a pair of length and a pair of width edge portions and an upper and a lower surface; a rib depending from the lower surface and adjacent each of said length edge portions of the plate, each of said ribs forming a longitudinal "U" shaped outwardly facing channel section; a latch with a hook shaped catch formed therewith, the latch attached to said lower surface of said upper mounting plate and a free-end extending outwardly beyond a first width edge portion of said upper plate, said hook shaped catch facing rearward toward the said second width edge portion and formed outwardly of said lower surface of said upper mounting plate; the latch being biased downward away from said lower surface of said upper mounting plate; a spring biased plunger residing within a spring and plunger housing have two end faces, said plunger housing attached to said lower surface of the upper mounting plate, parallel to and equidistant from the "U" shaped longitudinal channel sections, said plunger biased outwardly of a first end face of said spring and plunger housing and toward said latch; said upper surface of said upper mounting plate in contact with and attached to said floor panel of said utility tray; said lower mounting plate formed and having a rectangular shaped in

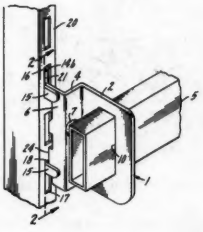
plan, a "U" shaped inwardly facing upturned channel formed along two length edge portions of said rectangular lower mounting plate, a first and second lip formed upwardly and at the mid-point of each of two width edge portions of the lower rectangular mounting plate, said lower mounting plate attached to said supporting surface, wherein said outwardly facing "U" shaped channels of the upper mounting plate slidingly receive, in dovetail fashion, the inwardly facing channels of the lower mounting plate; said spring biased plunger forcibly urged inward of said spring plunger housing by moving contact with said first upwardly formed lip, downwardly biased latch of said hook engagingly capturing the second upwardly formed lip of the lower mounting plate thereby releasably locking said utility tray in a predetermined location relative to said mounting surface whereby the utility tray when detachedly removed from said supporting surface converts to a wheeled tool and small part utility tray.

4,874,148

UNIVERSAL DISPLAY BRACKET

S. R. Guinter, Rockford, Ill., assignor to Newell Co., Freeport, Ill.

Continuation of Ser. No. 936,206, Dec. 12, 1986, abandoned.
This application Sep. 21, 1988, Ser. No. 248,276
Int. Cl.[4] F16L *3/08*
U.S. Cl. 248—225.2 8 Claims



1. A display bracket for use with a plurality of vertical slotted upright systems, one system having a slot spacing of a given distance and another system having a slot spacing different from the spacing in said one system, said display bracket including:

a bracket body,

said bracket body being adapted, when assembled to a slotted upright, to project transversely outwardly from said slotted upright,

means, carried by the bracket body, for securing the bracket to a slotted upright in any one of several slotted upright systems, all of which have dissimilar slot spacings, and for stabilizing the bracket, said bracket securing and stabilizing means comprising

a connecting and locking member projecting rearwardly from the bracket body at a first location on the bracket body, and

a stabilizing member projecting rearwardly from the bracket body at a second location on the bracket body, said second location being beneath said first location,

said connecting and locking member having a shank adapted to penetrate a slot in a vertical upright and a retaining portion extending downwardly from the shank at the distal end portion thereof,

said downwardly extending retaining portion being spaced from the bracket body a distance greater than the thickness of the slot material in a slotted upright with which it is adapted to be assembled,

said stabilizing member having a vertical height less than the vertical height of a slot in which it is adapted to be received,

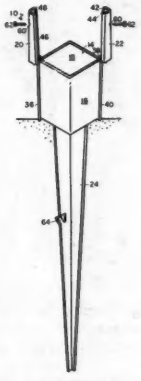
said stabilizing member further being located beneath the shank of the connecting end locking member a distance sufficient to enable said stabilizing member to be received in a stabilizer receiving slot in each of variety of systems.

4,874,149

POST SUPPORT

Daniel Miceli, Bristol, Conn., assignor to The Gordon Corporation, Southington, Conn.

Filed Sep. 15, 1988, Ser. No. 244,951
Int. Cl.[4] F16M *13/00*
U.S. Cl. 248—530 24 Claims



22. A post support for securing a post in the ground in a generally vertical, upright position which post support comprises:

(a) an elongated cruciform, ground-engaging element adapted to be driven generally vertically into the ground;

(b) a flat drive plate element secured to the top of the cruciform ground-engaging element to permit the use of a short section of the post to drive the ground-engaging element into the ground;

(c) a pair of upright, vertical wall sections each having side edges with edge folds, the opposing side edges spaced apart a slight distance, the wall sections forming a square, hollow, post-receiving section to receive the end of a square post to be supported; and

(d) a pair of generally right angled wedge end caps each having folded edges and adapted to fit in a slidable, wedging relationship with the edge fold of the wall sections so that when the wedge end caps are driven downwardly, the side of the pair of wall sections are forced inwardly into a post securing relationship with the end of the post.

4,874,150

SEGMENTAL FORMWORK FOR ROUND STRUCTURES

Otto Heinzle, Montlingen, Switzerland, assignor to Jugo-Import-Export-Anstalt, Furstentum, Liechtenstein

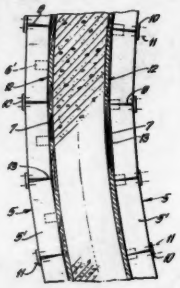
PCT No. PCT/EP86/00028, § 371 Date Nov. 4, 1986, § 102(e) Date Nov. 4, 1986, PCT Pub. No. WO86/04378, PCT Pub. Date Jul. 31, 1986
PCT Filed Jan. 24, 1986, Ser. No. 923,787
Claims priority, application Austria, Jan. 24, 1985, 190/85
Int. Cl.[4] E04G *11/20*
U.S. Cl. 249—18 8 Claims

1. A segmental formwork for round structures, comprising:

an internal formwork having at least two vertically spaced polygonal stretchers with a plurality of buckling points (8) around each stretcher, a soldier fixed between said stretchers for each buckling point, and at least one form-

work board being at least substantially continuously curved and being mounted for horizontal movement to each of said stretchers and each of said soldiers, said stretchers bearing directly against said at least one formwork board; and

an external formwork spaced outwardly from said internal formwork and having at least two vertically spaced polygonal stretchers with a plurality of buckling points (8) around each stretcher, a soldier fixed between said stretchers for each buckling point, and at least one formwork board being at least substantially continuously



curved and being mounted for horizontal movement to each of said stretchers and each of said soldiers, said stretchers bearing directly against said at least one formwork board;

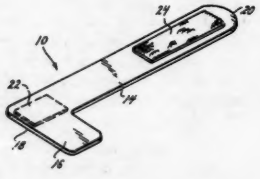
each said soldier of said internal formwork being fixed between said stretchers of said internal formwork at a respective buckling point of said internal formwork, and said soldiers of said external formwork being fixed midway between said stretchers of said external formwork at intermediate locations of said stretchers between buckling points of said stretchers.

4,874,151

GAS PUMP LEVER HOLDING DEVICE

Terry Fritz, 20 Green, No. 3, St. Charles, Mo. 63303

Filed Feb. 17, 1989, Ser. No. 312,897
Int. Cl.[4] G05G 5/06; F16K 31/00
U.S. Cl. 251—90 16 Claims



1. An adjustable gas pump trigger lever holding device adapted to be secured to an automatic gas pump nozzle having an operator's handle and a trigger lever below the handle that is manually adjusted between a closed and open position to regulate fluid flow from the nozzle, the holding device comprising:

a flexible strap having first and second ends and of predetermined length, the strap being adpated to extend in a loop around the top of the nozzle handle and the bottom of a nozzle trigger that has been manually adjusted to a desired position for a desired rate of fluid flow from the nozzle;

coupling means adapted to releasably secure the first end of the strap to the second end of the strap to form a loop having a desired peripheral length extending around the top of a nozzle handle and the bottom of a nozzle trigger that has been manually adjusted to a desired position for a desired rate of fluid flow from the nozzle, thereby holding the nozzle trigger in the adjusted position; and

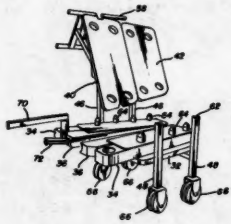
a tab section extending from the strap, the tab being adapted to maintain the first end of the strap stationary relative to the gas pump nozzle when the tab is held stationary relative to the nozzle, thereby enabling the strap to be releasably secured to the nozzle by manipulating only the second end of the strap around the nozzle handle and trigger and securing it to the first end of the strap by the coupling means.

4,874,152

CABLE GRIPPING BLOCK

Joseph E. Roberts, 318 Habersham St., Savannah, Ga. 31401, and William A. Griswold, Jr., 111 Dove La., Savannah, Ga. 31406

Filed Apr. 13, 1988, Ser. No. 180,906
Int. Cl.[4] B66D 3/02
U.S. Cl. 254—264 5 Claims



1. A cable gripping block for linear tensioning of a cable, comprising,

a base plate with a pair of traction block means affixed thereon;

a pair of clamping block means movably slidable between said traction block means;

said traction block means having inner face slide surfaces between which said clamping block means slide, where each inner face slide surface forms an angle with the longitudinal axis of a cable being tensioned;

said clamping block means having slide surfaces to match with the inner face slide surfaces of said traction block means where said clamping block means has a wedge shape with an apex angle which is equal to the angle formed between the adjacent slide surfaces and the longitudinal axis of said traction block means;

a cover plate means for closing said cable gripping block and locking said clamping block means between said traction block means, said cover plate means having a trapezoidal shape;

a securing means for securing said cover plate to said traction block means including tenon means on said traction block means and matching tenon receiving cavities in said cover plate means;

said tenon means having a suitable shape for guiding said tenons onto said cavities in said cover plate means;

means for lifting said cover plate means off of said tenon means;

said cover plate means including at least two trapezoidal sections, and where one of the sections is larger than the other with the smaller section having a base length equal to the length of the smaller of the parallel lengths of the larger section;

said cover plate sections each having a pair of manual lifting handles;

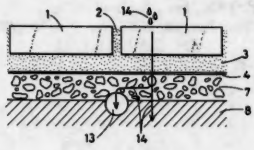
said tenon means having oriface means therethrough for receiving a locking pin.

4,874,153

PROCESS FOR PRODUCING CERAMIC PRODUCTS USING THE SLUDGE OBTAINED BY SEWAGE TREATMENT

Ryusuke Hashimoto, Niwa, and Mitsuru Iwata, Kani, both of Japan, assignors to Fujimi Tile Co., Ltd., Nagoya, Japan

PCT No. PCT/JP86/00536, § 371 Date Aug. 13, 1987, § 102(e) Date Aug. 13, 1987
PCT Filed Oct. 23, 1986, Ser. No. 71,273
Claims priority, application Japan, Oct. 24, 1985, 60-238170; Jan. 27, 1986, 61-15079
Int. Cl.[4] C04B *35/64*
U.S. Cl. 264—63 6 Claims



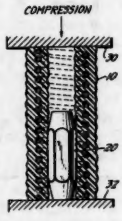
1. A process for producing ceramic products comprising the steps of (a) mixing together at least ashes prepared by burning a sludge obtained by sewage treatment and a plastic ceramic raw material to prepare a moldable body; (b) molding the body into a desired shape; and (c) firing the molded body.

4,874,154

ENCAPSULATED SPRING ASSEMBLY FOR RECLINING FURNITURE

Paul J. Zimbone, Raynham, Mass., assignor to Acushnet Company, New Bedford, Mass.

Continuation of Ser. No. 64,333, Jun. 19, 1987, abandoned. This application Feb. 23, 1989, Ser. No. 316,549
Int. Cl.[4] F16M *3/00*; B60G *11/52*
U.S. Cl. 267—140.4 7 Claims



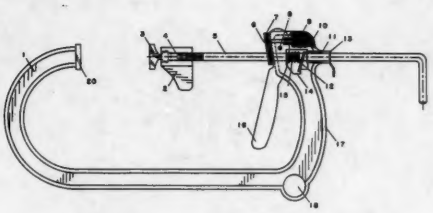
1. In reclining furniture having a reclining mechanism for providing resistance during periods of movement of said reclining furniture wherein a spring assembly is used in said reclining mechanism to provide said resistance, the improvement in said spring assembly comprising: an encapsulated helical spring, encapsulated in a polymeric material to provide constant force during periods of compression and expansion of said helical spring in said reclining mechanism of said reclining furniture, said encapsulated helical spring having a hollow internal area, said hollow internal area having an inner diameter, said encapsulated spring having an effective length; and a rigid dowel member inserted in said hollow internal area, said rigid dowel member having an outer diameter substantially equal to the inner diameter of said hollow internal area, said rigid dowel member having a length no greater than the effective length of said encapsulated spring.

4,874,155

FAST CLAMP

Ashley S. Goul, P.O. Box 1869, Boise, Id. 83701

Filed Sep. 9, 1988, Ser. No. 242,633
Int. Cl.[4] B66F *3/00*
U.S. Cl. 269—6 5 Claims



1. A clamping apparatus for clamping a workpiece, comprising:

a clamp body, the body having a first end with a contact point and an opposing handle end defining a sleeve aligned with the contact point;

a plunger sized to slide within the sleeve toward and away from the contact point;

advancing means for moving the plunger toward the contact point, the advancing means having a first end defining an opening through which the plunger extends and a second end spaced apart from the plunger;

trigger means pivotally mounted to the handle end for pressing the second end of the advancing means toward the contact point when the trigger means is squeezed, the advancing means when so pressed wedging against the plunger to move the plunger toward the contact point;

retracting means for urging the second end of the advancing means toward the handle end when the trigger means is released, the advancing means when so moved sliding freely relative to the plunger ;

locking means for maintaining the plunger in place after it has been moved by the action of the trigger means and advancing means, the locking means having a first end defining an opening through which the plunger extends, a second end spaced apart from the plunger, and a bias means urging the second end away from a position perpendicular to the plunger to allow movement of the plunger toward the contact point but to prevent movement of the plunger away from the contact point; and

release means for urging the second end of the locking means toward a position perpendicular to the plunger to allow for movement of the plunger away from the contact point.

4,874,156

HAND OR FOOT MANIPULATED SELF CLAMPING DEVICE

Abe Goldzweig, 14627 Hesby St., Sherman Oaks, Calif. 91405

Filed Jan. 7, 1988, Ser. No. 141,542
Int. Cl.[4] B25B *1/16*
U.S. Cl. 269—158 5 Claims

1. A holding tool and vise combination suitable for holding, adjusting and clamping a work piece by independent use of a foot pedal and the operator's hands, the combination comprising

a stationary base with a raised edge;

a secondary base resting on the stationary base and removable therefrom;

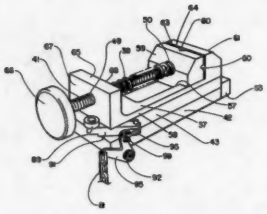
a stationary jaw integral with the secondary base;

a slotted slide slidably attached to the secondary base;

a movable jaw integral with the slotted slide at its one extremity;

a slide raise integral with the slotted slide at its other extremity;

a spring means acting to spread apart the stationary jaw and the slide raise and thereby providing a holding force to push together the movable jaw and the stationary jaw to hold the work piece;



a clamping means to proivde a rigid vise grip on the work piece between the stationary jaw and the movable jaw independent of the spring means; and

a linkage means to translate the vertical motion of the foot pedal to horizontal motion of the slotted slide in a direction moving the movable jaw away from the stationary jaw to open the gap between the jaws to admit the work piece, thereby compressing the spring means.

4,874,157

METHOD FOR MINIMIZING MATERIAL UTILIZATION DURING SPREADING OF A MATERIAL WEB

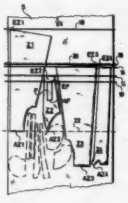
Rolf Jung, Waiblingen; Albert Buss, Muensingen, and Winfried Buchmann, Hemmingen, all of Fed. Rep. of Germany, assignors to Krauss u. Reichert GmbH & Co. KG Spezialmaschinenfabrik, Fellbach, Fed. Rep. of Germany

Filed Apr. 12, 1988, Ser. No. 180,520

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1987, 3713010

Int. Cl.[4] B65H *29/46*

U.S. Cl. 270—30 **34 Claims**



1. A method for minimizing material utilization during spreading of a flawed material web, in particular a fabric web, wherein if the flaw falls in at least one pattern piece of a pattern the following steps are executed:

(a) proceeding from a region determined by said flaw, placing a set of at least two virtual stop lines extending transversely to the spreading direction over the entire width of said material web according to predefined criteria in the pattern representation and all the flawless pattern pieces cut by said virtual stop lines are determined;

(b) applying an optimization criterion for minimizing material utilization which takes into consideration the flawless pattern pieces cut by said virtual stop lines and the flawed pattern pieces and selecting the one of said virtual stop lines resulting in a minimum waste of material;

(c) interrupting the spreading at said selected stop line;

(d) determining a maximum distance from said stop line which maximum distance corresponds to the furthest distance of a starting point of one of said flawless pattern pieces cut by said stop line or of one of said flawed pattern pieces from said stop line;

(e) placing a restart line parallel to said stop line in the direction opposite to the spreading direction at least within the maximum distance from said stop line;

(f) driving the spreading machine back from said stop line in the direction opposite to the spreading direction to said restart line; and

(g) continuing spreading from said restart line.

4,874,158

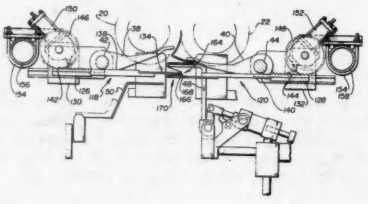
DISPENSING FOLD IMPROVEMENT FOR A CLIP SEPARATOR

Timm G. Retzloff, Washburn, Wis., assignor to C. G. Bretting Manufacturing Co., Inc., Ashland, Wis.

Filed Jun. 20, 1988, Ser. No. 209,220

Int. Cl.[4] B41L *1/32*

U.S. Cl. 270—39 **14 Claims**



1. A method of forming a dispensing fold for a clip of a predetermined number of interfolded sheets from a continuously building interfolding process stack comprising the steps of:

a. continuously interfolding and supporting a plurality of individual sheets on a stack supporting means at a package building station to form an interfolding process stack along a principal axis with one layer of the interfolded sheets depending freely from the bottom of the stack below the stack supporting means;

b. advancing a first dispensing fold finger lateral to the principal axis to an actuated position wherein a leading edge of the first dispensing fold finger is in contact with a mediate portion of the depending layer; and

c. advancing a second dispensing fold finger lateral to the principal axis to an actuated position overlapping and subjacent the first dispensing fold finger in its actuated position such that the depending layer is folded against the first dispensing fold finger.

4,874,159

PAPER FEED DEVICE AND PAPER CASSETTE THEREFOR

Mikihiko Maeno; Yukio Ohta; Yoshiharu Momiyama; Hisao Ono; Katsumasa Takahata; Kazuyuki Ozono; Makoto Shimizu, and Mikio Yamamoto, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Apr. 15, 1988, Ser. No. 182,230

Claims priority, application Japan, Apr. 16, 1987, 62-92029; Apr. 16, 1987, 62-56711[U]; Apr. 17, 1987, 62-57534[U]; May 14, 1987, 62-70911[U]; May 28, 1987, 62-79873[U]

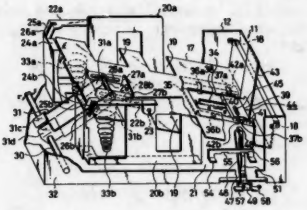
Int. Cl.[4] B65H *1/12*

U.S. Cl. 271—171 **14 Claims**

1. A paper cassette which stores media on a media load plate, said media load plate being journalled at one end so that it is able to rotate and being raised and lowered by moving the other end, and which performs paper feed by pushing up said

other end of the media load plate with a spring thereby pressing the top of the media against a hopping roller, wherein said media load plate has an opening toward said one end, said paper cassette comprising:

a guide bracket attached to said media load plate so that it covers the opening from the lower side of said media load plate, said guide bracket possessing multiple first stopping means in positions corresponding to the lengths in the media delivery direction of the multiple types of media, and



a media back edge guide assembly which is able to move in the delivery direction of the media, which possesses a second stopping means which engages with one of said first stopping means, and which is positioned according to the sizes of a number of types of media, said media back edge guide assembly comprising a slide block and a guide plate said slide block being provided between the media load plate and said guide bracket.

4,874,160

PAPER CARTRIDGE WITH PAPER ALIGNING MEANS

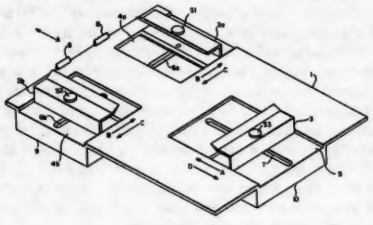
Kazushi Yamamoto, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Nov. 12, 1987, Ser. No. 119,536

Claims priority, application Japan, Nov. 20, 1986, 61-180294[U]

Int. Cl.[4] B65H *9/06*

U.S. Cl. 271—227 **9 Claims**



1. In a paper cartridge comprising a table for placing and storing thereon sheets of paper transported along a paper transporting passageway which defines a direction of transportation, two side plates parallel to said direction of transportation adapted to individually contact the two edges of sheets placed on said table, and to move perpendicularly to said direction of transportation, and a back plate adapted to contact the back edges of sheets placed on said table and to move in said direction of transportation, the improvement wherein said paper cartridge further comprises a first mechanism for moving said two side plates symmetrically with respect to a central axis along said direction of transportation, a second mechanism for moving said back plate along said direction of transportation, detectors attached to said side and back plates and adapted to detect edges of sheets, and side-plate and back-plate control means for operating said first and second mechanisms, respectively, according to outputs from said detectors, said control means being so programmed as to automatically operate said mechanisms when sheets of paper are placed on said table to move said side and back plates away from one another to home positions thereof, to thereafter move said side plates towards each other while measuring a distance L traveled by said side plates between a first point in time when one of said detectors attached to one of said side plates detects a sheet and a second point in time when another one of said detectors attached to the other of said side plates detects said sheet, and to further move said side plates by a/2 if L is greater than a, a being a distance determined by the positions of said detectors on the respective ones of said plates.

4,874,151

SHEET TRANSPORTING APPARATUS

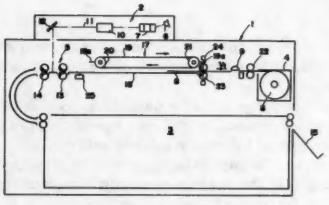
Sadanobu Murasaki, Isehara, and Hiroyuki Makiyama, Tokyo, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Japan

Filed Nov. 18, 1987, Ser. No. 124,955

Claims priority, application Japan, Nov. 19, 1986, 61-275578

Int. Cl.[4] B65H *5/16*

U.S. Cl. 271—265 **11 Claims**



1. A sheet transporting apparatus comprising;

transport means for transporting a sheet at a predetermined speed V0;

a guide member provided upstream of said transport means with respect to a sheet transport direction for guiding the sheet toward the transport means; and

a projecting member which is movable from a start point to a terminal point along the guide member in the sheet transport direction for urging the rear end of the sheet toward the transport means during its movement and delivering the sheet to the transporting means, said projecting member being movable initially from said start point to said terminal point at a speed V1 as the projecting member urges the sheet toward the transport means and then as a leading end of the sheet moves from a speed adjusting position to said transport means at a speed V2 lower than the speed V1 and lower than the speed V0.

4,874,162

MOTION PICTURE AMUSEMENT RIDE

Douglas Trumbull, Santa Monica; David Collins, Westlake Village; Wayne Smith, Los Angeles, all of Calif., and Robert Spieldiener, Vaduz, Switzerland, assignors to Showscan Film Corporation, Culver City, Calif.

Continuation of Ser. No. 121,122, Nov. 16, 1987, Pat. No. 4,798,376, which is a continuation of Ser. No. 811,104, Dec. 19, 1985, Pat. No. 4,732,065. This application Nov. 14, 1988, Ser. No. 270,352

The portion of the term of this patent subsequent to Jun. 21, 2005, has been disclaimed.

Int. Cl.[4] A63G *31/16*

U.S. Cl. 272—18 **2 Claims**

1. An amusement ride apparatus comprising:

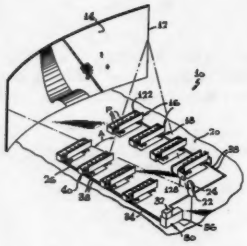
means for holding a plurality of passengers;

image means including a screen viewable by said passengers

and means for forming a predetermined motion picture image on said screen with at least a portion of said image representing the view from a moving vehicle;

drive means for moving said passenger holding means in synchronism with said motion picture image to simulate, at least partially, forces that would be experienced by passengers in said moving vehicle;

said means for holding passengers comprising a plurality of passenger-holding frames, said drive means comprising a plurality of sets of actuators, each said set of actuators associated with a different one of said frames and control-



lable to move the corresponding frame, and said drive means includes means for controlling said sets of actuators in synchronism;

each said passenger-holding frame includes at least one seat positioned to hold a seated passenger facing in a predetermined forward direction towards said screen;

each said set of actuators is constructed to tilt said seat about an axis (82) that extends primarily horizontally and perpendicular to said forward direction;

each said frame being tiltable about its own individual said axis with said axis of one of said frames spaced further from said screen than said axis of a second of said frames.

4,874,163

ROCKING TOY

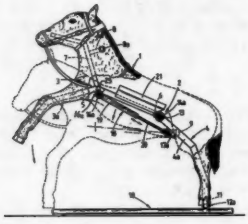
Sebastiano R. Chiavetta, and Giorgio De Guglielmi, both of Schio, Italy, assignors to Applause, Inc., Woodland Hills, Calif. and Jockline, S R L., Italy

Filed Oct. 2, 1987, Ser. No. 104,642

Claims priority, application Italy, Jun. 19, 1987, 48078 A/87

Int. Cl.[4] A63G *17/00*

U.S. Cl. 272—53.2 **7 Claims**



1. A rocking toy comprising:

a base;

a support frame carried by said base, said frame having a hind section and a fore section pivotally coupled to the hind section;

an external, flexible, animal-shaped body supported by the support frame;

means for rigidly supporting the hind section on the base; and

resilient means coupling the hind section to the fore section for compressively storing the energy of a downward movement of the fore section, and assisting an upward movement of the fore section by releasing said energy.

4,874,164

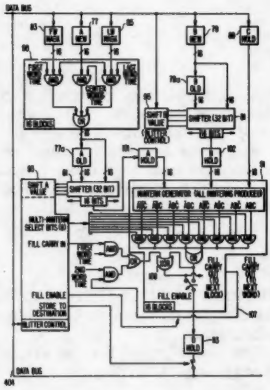
PERSONAL COMPUTER APPARATUS FOR BLOCK TRANSFER OF BIT-MAPPED IMAGE DATA

Jay G. Miner, Mtn. View; Dave Dean, Ukiah; Joseph C. Decuir, Albany; Ronald H. Nicholson, Sunnyvale, and Akio Tanaka, Burlingame, all of, assignors to Commodore-Amiga, Inc., Los Gatos, Calif.

Filed Jul. 18, 1986, Ser. No. 886,796

Int. Cl.[4] A63F *9/22*

U.S. Cl. 273—1 E **32 Claims**



1. A personal computer system to provide video output signals to a raster display, wherein an image consisting of a plurality of pixels if assembled on a screen of the raster display by an electron beam scanning the screen, and wherein the visual characteristics of a pixel being scanned by the electron beam are determined by the video output signals provided by the personal computer system when the pixel is being scanned, and wherein the personal computer system comprises:

central processor means for executing program instructions;

memory means including a plurality of addresses for storing bit-mapped image data, wherein the visual characteristics of a pixel are defined by bit-mapped image data stored in at least one address corresponding to the pixel;

data bus means coupled to the processor means and the memory means for transferring data;

address bus means coupled to the processor means and the memory means for transferring an address to the memory means;

pointer means, coupled to the address bus means, for selecting a plurality of source addresses in the memory means as a plurality of sources of unprocessed bit-mapped image data to be transferred on the data bus means, and for selecting a destination address in the memory means as a destination of processed bit-mapped image data to be transferred on the data bus means;

blitter means, coupled to the data bus means, for transferring a block of bit-mapped image data between the blitter means and the memory means, and for processing the block of bit-mapped image data, wherein the blitter means includes:

means for receiving from the data bus means unprocessed

bit-mapped image data stored in the memory means at the plurality of source addresses;

logic means, for executing a logical operation on unprocessed bit-mapped image data simultaneously input from the receiving means for each of the plurality of source addresses, to generate processed bit-mapped image data; and

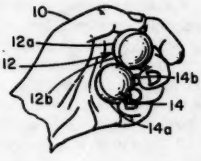
means for providing the processed bit-mapped image data to the data bus means for storage in the memory means at the destination address; and

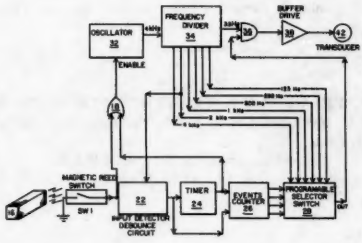
image display means, for receiving bit-mapped image data stored in at least one address corresponding to a pixel, and for generating the video output signals determining the visual characteristics of the pixel.

4,874,165
EXECUTIVE BALLS

Joseph Steinberg, 1 Verton Ct., East Northport, N.Y. 11779, and Raphaela McCabe, 9 Audrey St., Miller Place, N.Y. 11764

Filed Aug. 29, 1988, Ser. No. 237,975
Int. Cl.[4] A63F 9/06
U.S. Cl. 273—1 GC 10 Claims





1. A sound producing game device for challenging the dexterity and coordination of a player comprising:

a. a first sphere containing means for establishing a magnetic field;

b. a second sphere containing switch means for being actuated by said magnetic field when said first and second spheres come within a predetermined position of each other;

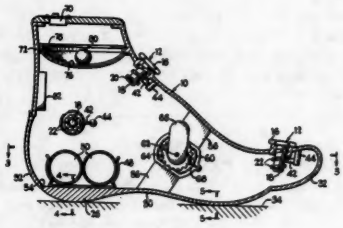
c. circuit means in response to actuation of said switch means for producing an audible signal at a preselected frequency, said audible signal terminating after a predetermined period of time after initiation of said audible signal; and

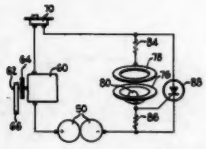
d. said circuit means including means in response to the repeated actuation of said switch means within said predetermined period of time to initiate another audible signal at a different preselected frequency, the other audible signal terminating after said predetermined time measured from the initiation of said other audible signal unless said switch means is again actuated and initiates a new audible signal at a different frequency.

4,874,166
SKILL ACTION GAME WITH A TILTABLE HOUSING AND AN ALARM PRODUCING DISTURBANCE SENSOR

Wayne A. Kuna, River Forest, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

Filed Jan. 17, 1989, Ser. No. 296,988
Int. Cl.[4] A63F 9/00
U.S. Cl. 273—1 GC 18 Claims





1. A skill action game comprising in combination:

a housing;

the housing having a bottom;

a curved surface depending from the bottom such that the housing is not stable when placed upon a substantially planar surface;

a plurality of items removably carried by the housing;

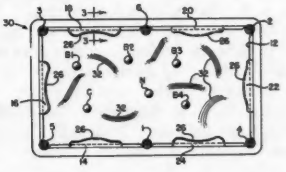
means sensing tilting of the housing relative to the substantially planar surface; and

an alarm activated by the sensing means.

4,874,167
APPARATUS AND METHOD FOR SIMULATING THE GAME OF GOLF

Devere D. Hillard, 1109 N. Valley Rd., Apache Junction, Ariz. 85220

Filed Oct. 5, 1988, Ser. No. 253,571
Int. Cl.[4] A63F 7/06; A63D 15/06; A63B 67/02
U.S. Cl. 273—14 17 Claims



1. A simulated golf game comprising:

a playing surface having a contour and a raised peripherial edge around said playing surface, said raised peripherial edge having a longitudinally contoured resilient portion facing and defining said area of play;

a plurality of ball receiving pockets positioned at spaced

apart locations around the peripherial edge opening into said area of play:

means for selectively changing the longitudinal contour of selective sections of said resilient portion of said peripherial edge to selectively change the longitudinal contour of the resilient portion of the peripherial edge to substantially an infinite number of different longitudinal contours providing for selectively changing the area of play into substantially an infinite number of different shapes;

at least one playing ball, and

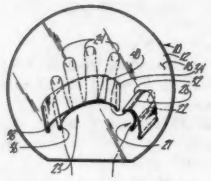
a cueball, whereby at least one player propels said cue ball using a cue stick to strike and direct said playing ball around said area of play into each pocket in a predetermined order.

4,874,168

BALL CATCHING TRAINER

Robert L. Wright, Des Moines, Iowa, assignor to Creative Athletic Products and Services, Inc., Des Moines, Iowa

Filed Jul. 29, 1988, Ser. No. 225,888
Int. Cl.[4] A63B 71/02
U.S. Cl. 273—26 C 2 Claims



1. A ball catcher trainer comprising,

a body member having a front ball-side and a rear-hand side, said body member having openings extending through said body member between the front and rear sides,

a hand strap means on said rear side extending through said openings to hold said strap to said body member and to form finger pockets on said back side adapted to receive a user's fingers for holding said body member on the user's one hand,

said finger pockets including one pocket for the user's thumb and one pocket for the other four fingers,

said strap means being woven through said openings back and fourth between the front and rear sides to form said thumb and four finger pockets, and

said strap including one end on said rear side of said body member with the strap extending through a first opening to the front side and returning through a second opening to the rear side and then extending through a third opening to the front side and forming said thumb pocket on the rear side between said second and third openings, and then back through a fourth opening to the rear side to form said four-finger pocket by extending back to the front side through a fifth opening, and then lastly extending through a sixth opening to the rear side where said other end is adapted to be secured to said four-finger pocket, and said one end is adapted to be secured to said thumb pocket.

4,874,169

BALL

Peter G. Litchfield, 6 Ella Grove, Chelsea, Victoria, Australia (3196)

Continuation of Ser. No. 834,964, Feb. 28, 1986, abandoned, which is a continuation-in-part of Ser. No. 676,941, Nov. 30, 1984, abandoned. This application Mar. 21, 1988, Ser. No. 171,464
Claims priority, application Australia, Dec. 2, 1983, PG2670
Int. Cl.[4] A63B 39/08
U.S. Cl. 273—60 R 9 Claims

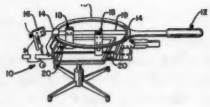
1. A hand projectable game ball of generally spherical shape including a pair of complementary hemispherical portions joined along a generally equatorial line, one of said hemispheres of said pair including a predetermined uniform surface configuration extending over the entire surface of said hemisphere, the other hemisphere of said pair including an equatorial zone immediately adjacent said equatorial line, a polar zone and an intermediate zone between said polar and said equatorial zones, and flight control means on said other hemisphere substantially influencing the flight of the ball when thrown and confined solely to the area of said other hemisphere delineated as said intermediate zone and occupying between 1 pand 30 percent of said second hemispherical surface.

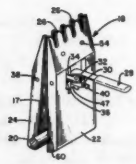
4,874,170

STRING CLAMP FOR RACQUET STRINGING MACHINE

Ronald G. Zech, El Cajon, Calif., assignor to Ektelon, San Diego, Calif.

Filed Sep. 26, 1988, Ser. No. 249,602
Int. Cl.[4] A63B 51/14
U.S. Cl. 273—73 A 8 Claims





1. A toggle action string clamp for a racquet stringing machine comprising:

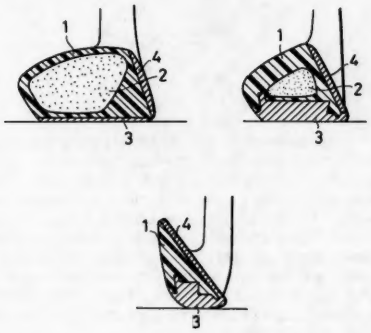
parallel top and bottom vise members having finger-like projections extending along the longitudinal axis of said members from one end thereof, and a semicircular groove located in the other end thereof at right angles to said axis, said grooves facing each other;

a handle member which includes a U-shaped portion and a grip lever portion;
an adjustable U-shaped wedge block;
two spacer nuts, and
two angular link members,
wherein said link members are positioned in slots in said vise members, the end portions of said link members being respectively pivotally connected to said bottom vise member, and to said handle member by means of connecting pins, the connecting pin connecting said handle member passing through elongate holes in the U-shaped portion thereof, and wherein the connecting pin passing through said handle member also passes through said spacer nuts, one of which is positioned on each side of said handle member, and wherein further, said wedge block is connected to said handle member by an adjustment screw and is positioned between shoulders located on said handle member, and said spacer nuts, and wherein still further, said top vise member is located between said bottom vise member and said handle member and has a locking pin extending through the slots located therein, at right angles thereto, whereby the U-shaped portion of said handle member can be formed against said locking pin, urging said vise members together when the clamp is positioned in its closed position.

4,874,171
GOLF CLUB SET

Hiroshi Ezaki; Yoneji Kobayashi, and Katsumi Iida, all of Tokyo, Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Sep. 10, 1987, Ser. No. 95,281
Claims priority, application Japan, Sep. 12, 1986, 61-215081
Int. Cl.[4] A63B *53/00, 53/04*
U.S. Cl. 273—77 A **3 Claims**

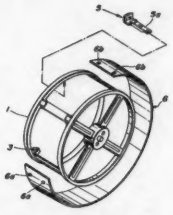


1. A golf club set comprising first, second and third groups of golf clubs, each of the clubs in the set comprising a shaft connected to a head at one end of said shaft, each of the heads having a hitting face for hitting a golf ball, said hitting face being inclined to define a loft angle, each of the clubs of the set having said loft angle selected from the range of 9° to 50°, the loft angle of each of the clubs in the set being different and increasing within said first, second and third groups, each of the clubs having a shaft length decreasing from club to club as the loft angle increases from club to club, each of the heads having a center of gravity a distance Z from the hitting face and located within the head, the distance Z decreasing from club to club as the loft angle increases from club to club, each golf club head of the first group of golf clubs having a loft angle selected in the range of from 9° to 25°, each golf club head of the first group of clubs being constructed with a sole plate attached to a first group shell molded of a synthetic resin, a filled cavity formed within the first group shell, each golf club head of the second group of golf clubs having a loft angle selected in the range of from 22° to 31° and being constructed with a seconnd group shell of a synthetic resin, a filled cavity formed within the second group shell and a sole plate integrally molded with the second group shell, and each golf club head of the third group of golf clubs having a loft angle selected in the range of from 28° to 50° and being constructed with a solid means of synthetic resin having a relatively high specific gravity as compared to the synthetic resin of the first group shell and the second group shell, and a sole plate integrally molded with the solid mass of synthetic resin.

4,874,172
REEL TARE FIXING DEVICE AND REEL

Kikuo Nakamura, Iruma, Japan, assignor to Sigma, Incorporated, Tokyo, Japan

Filed Nov. 1, 1988, Ser. No. 265,714
Claims priority, application Japan, Nov. 13, 1987, 62-287927
Int. Cl.[4] A63F *5/04*
U.S. Cl. 273—143 R **21 Claims**

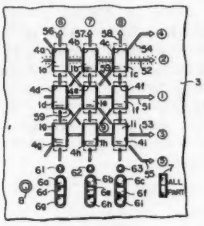


20. A device for securing a reel tape to a circular reel frame of a slot machine, comprising a support means adapted to secure end portions of the tape in overlapping relationship, and mounting means for mounting the support means to the frame, the mounting means being adapted to locate the support means radially and circumferentially with respect to the frame and to allow adjustment of the circumferential location therealong.

4,874,173
SLOT MACHINE

Ryutaro Kishishita, 109 Yamatecho, Naka-ku, Yokohama, Kanagawa, Japan

Filed May 2, 1988, Ser. No. 189,328
Claims priority, application Japan, Dec. 11, 1987, 62-187803[U]; Dec. 25, 1987, 62-327427; Feb. 18, 1988, 63-34069
Int. Cl.[4] A63F *5/04*
U.S. Cl. 273—143 R **4 Claims**



1. A wheel mechanism for a slot machine, comprising:
(a) an n-by-n spaced apart matrix of relatively small diameter cylindrical bodies, where n is at least three;
(b) n-times-n independently controlled motors, each of said motors being capable of rotating one of said bodies;
(c) a control means operated by a slot machine user for selectively stopping the rotation of said bodies, said control means comprising:

n first stopping devices for simutaneously stopping a line of said bodies in said matrix,

n-times-n second stopping devices for stopping each of said bodies individually,

whereby a user may determine the number of bodies to be stopped and the order of stopping said bodies.

4,874,174

TUBE CONNECTING UNIT

Fumio Kojima; Yoshikazu Tachiiri, and Yoshihisa Kato, all of Toyota, Japan, assignors to Aisin Seiki Kabushiki Kaisha and Toyota Jidosha Kabushiki Kaisha, both of Aichi, Japan

Filed Mar. 7, 1988, Ser. No. 165,057

Claims priority, application Japan, Mar. 5, 1987, 62-32304; Aug. 31, 1987, 62-217600

Int. Cl.[4] F16L *21/06*

U.S. Cl. 285—82 **2 Claims**

1. A tube connecting unit comprising:

a cylindrical adapter having a stepped inner bore and a pair of opposite slits formed in the periphery thereof and extending into communication with said inner bore;

a cylindrical connector fitted in the stepped inner bore of said cylindrical adapter and having an inner bore for receiving a tube and an annular groove formed on the periphery thereof in alignment with said slits of the adapter;

a tube inserted into the inner bore of said connector, one end portion of said tube being provided with a bead, a flange and an annular groove between said bead and said flange for receiving a sealing member, said bead and said flange being disposed in guiding engagement with said inner bore of said adapter with said flange engaging one end of said connector to prevent the tube from slipping out of the connector;

a sealing member disposed in said groove in engagement with aid inner bore of said adapter; and

a spring member comprising a clip spring and a stopper for resiliently engaging said connector to said adapter and preventing the connector from slipping out of the adapter, said clip spring having a pair of arms fitted in said slits of the adapter and in said annular groove of the connector, an arched portion connecting the ends of said arms and a pair of extending portions formed on the other ends of each of said arms, said stopper comprising a first portion adapted to be inserted in between the extending portions for maintaining the spring force of the clip spring and a second portion engaging with either the peripheral surface of said connector or said adapter for maintaining stability of said first portion.

4,874,175

LOTTERY DICE

Daniel E. Fischer, 2845 N. Kings Rd., Virginia Beach, Va. 23452

Filed Oct. 11, 1988, Ser. No. 256,054

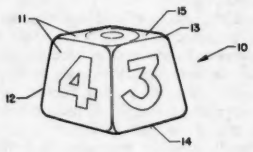
Int. Cl.[4] A63F *9/04*

U.S. Cl. 273—146 **4 Claims**

1. A gaming device suitable for selecting random numbers for lottery games comprising:

a hexahedral die having faces valued from zero to four and a base surface inscribed with a symbol;

means for biasing said hexahedral die such that there is a reduced probability for the appearance of the symbol on the uppermost surface of the die when the die is thrown, said biasing means comprising the inward slanting of the



sides of the die so as to reduce the surface area of the face opposite said base to approximately two-thirds of the surface area of the base; and

a second die keyed to a second range of numbers.

4,874,176

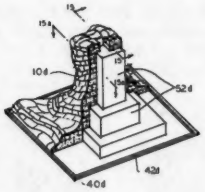
THREE-DIMENSIONAL PUZZLE

Seymour Auerbach, 115 Hesketh St., Chevy Chase, Md. 20015

Filed Mar. 31, 1987, Ser. No. 32,343

Int. Cl.[4] A63F *9/12*

U.S. Cl. 273—157 R **22 Claims**



6. A three-dimensional puzzle for forming solely a single intelligible three-dimensional representation, comprising:

a plurality of puzzle pieces identical in geometric form in plan and having top, bottom, and side surfaces, the top surface of each puzzle piece being in three-dimensional sculpted form and which sculpted surfaces in the aggregate and upon assembly of the puzzle pieces into predetermined positions form solely a predetermined single intelligible three-dimensional representation, with any other assembly of said pieces forming a non-intelligible three-dimensional configuration;

the side surfaces of said puzzle pieces extending linearly in lateral directions and being free of any means, including interlocks between said side surfaces, which would indicate the location and orientation of any puzzle piece in the final assembly of the puzzle, each side surface of each puzzle piece adjacent another puzzle piece abutting and lying in conformal relation with a side surface of said adjacent puzzle piece without any interlock therebetween upon assembly of said puzzle pieces, the bottom surface of each said puzzle piece having an interlocking part, said bottom surface and said interlocking part of each puzzle piece being identical in shape to the shapes of the bottom surface and interlocking part of each other puzzle piece, respectively, and being free of any means which would indicate the location and orientation of any puzzle piece in the final assembly of the puzzle;

a base underlying the puzzle pieces and carrying a plurality of elements cooperable with said interlocking parts to retain said pieces in said predetermined assembly with said side surfaces abutting one another, said base being free of any means, including said elements, which would indicate

the location and orientation of any puzzle piece in the final assembly of the puzzle; and

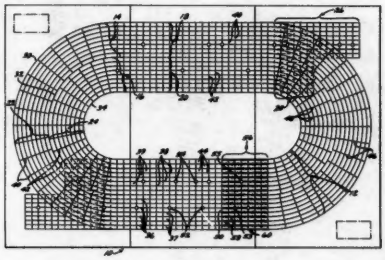
at least one filler piece for underlying at least a portion of one of said puzzle pieces for elevating said one puzzle piece to elevate its sculpted surface above the elevation thereof without said filler piece, said elevated puzzle piece having its sculpted surface forming upon assembly with said plurality of puzzle pieces and said filler piece the three-dimensional representation.

4,874,177

HORSE RACING GAME

Ronald E. Girardin, 67660 Paletero Rd., Cathedral City, Calif. 92234

Filed May 30, 1984, Ser. No. 615,284
Int. Cl.[4] A63F *3/00*
U.S. Cl. 273—246 **36 Claims**



1. A horse racing game comprising:

a gameboard bearing the representation of a racetrack divided into a plurality of lanes,

said lanes being divided by a plurality of transversely extending lines dividing said racetrack into a grid of position squares marking fixed distances along said lanes,

a plurality of moveable markers representing entries in a simulated race to be enacted on said gameboard, said markers being moveable around said represented racetrack in order to mark the progress of said entries during the running of said simulated race,

random number generator means and,

a plurality of horse performance cards, each of said cards bearing information regarding a potential said entry in said simulated race, said information including a numbers matrix comprising a selector column of selector numbers selectable according to numbers generated by said random number generator means, and a move column adjacent said selector column and containing a series of move numbers registering with respective said selector numbers, each of said move numbers directly indicating the distance in terms of said position squares that said marker corresponding to said horse performance card is to move about said represented racetrack on any given move,

said numbers matrix inscribed on each of said horse performance cards representing the actual performance of a real horse in a real historical racing event.

4,874,178

PARLOR LOTTERY GAME

George J. Gage, 2201 N. Beverly Glen Blvd., Los Angeles, Calif. 90077

Filed Jan. 13, 1989, Ser. No. 296,605
Int. Cl.[4] A63F *3/06*
U.S. Cl. 273—274 **1 Claim**

1. A parlor board game for two or more participating players comprising:

a foldable playing board having a square grid pattern whereon numerical indicia are imprinted;

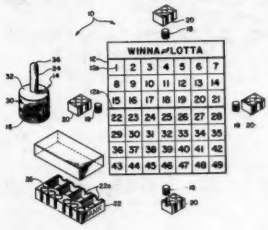
said numerical indicia are imprinted on the surface of the board in a consecutive order;

said imprinted numerical indicia duplicating the numerical sequence imprinted on the tickets of a state lottery;

a hollow transparent shaker device;

said transparent shaker having enclosed therein a plurality of spherical balls imprinted with numerical indicia conformal to the indicia imprinted on said playing board;

said transparent shaker having a transparent hollow handle wherein a restricted quantity of said balls can be funneled from an enlarged chamber of said shaker into said handle to provide a random selection of numbers or indicia to facilitate the playing of the game;



a plurality of colored players' chips, distributed equally to each of the participating players in accordance to their color distinction at the commencement of the game;

a player's chip deposit box wherein said player's chips can be deposited during the progression of the game, said container color-coded to match said colored player's chips to be contained therein;

a banker's container wherein a plurality of separate color-coded compartments permits the storage of players' pay-off chips as well as the players' chip deposit boxes; and

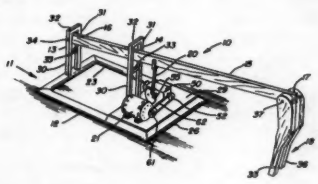
an enclosing cover for said banker's container.

4,874,179

MECHANICAL ROPING DUMMY

Tommy L. Henderson, P.O. Box 43, Seadrift, Tex. 77983

Filed May 19, 1989, Ser. No. 354,305
Int. Cl.[4] A63B *69/00*
U.S. Cl. 273—338 **16 Claims**



1. A mechanical roping dummy for use in practice roping comprising

a stand having a base and first and second upright frames rigid with said base and spaced respectively in fore and aft alignment thereon,

an elongated bar pivotally mounted at one end on said first upright frame for oscillation in a vertical plane and being guided in its vertical oscillation by said second upright frame,

said bar overlying said base with its other end extending rearwardly beyond the base,

a pair of legs resembling the hind legs of an animal pivotally mounted on the rearward end of said bar and depending

therefrom, each leg being on an opposite side of said bar from the other leg,

resilient means extending between said bar and said legs for biased said legs in a forward direction,

a drive arm pivotally connected to said bar between the ends thereof for moving said bar in vertical oscillation,

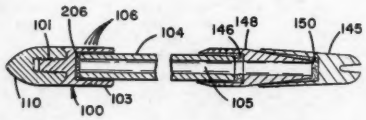
a motor mounted on said base, and means driven by said motor for driving said drive arm to oscillate said bar.

4,874,180

ARROW SHAFT END ADAPTOR APPARATUS AND BALANCE PIN APPARATUS AND METHOD

Conrad F. Fingerson, Chatfield; Dennis L. Carlson, Brooklyn Park; Bruce A. Nelson, Chatfield, and Robert D. Eickhoff, Fountain, all of Minn., assignors to AFC, Inc., Chatfield, Minn.

Filed Sep. 29, 1987, Ser. No. 102,028
Int. Cl.[4] F41B 5/02
U.S. Cl. 273—416 **2 Claims**



1. A single piece end adaptor for attachment to a hollow circular arrow shaft, said arrow shaft having a first end and a second end and an opening with an inner surface defined therethrough, said single piece end adaptor comprising;

a cylindrical body having a ferrule end and an externally threaded end,

and ferrule end having an outer diameter and a cylindrical bore with a continuous inner surface defined upwardly therein, the inner surface of said bore adhesively engageable about a portion of the first end of the circular arrow shaft;

said externally threaded end opposite said ferrule end having constant pitch and constant diameter external threads defined thereabout, and an inclined surface defined in a circular manner about the intersection of said ferrule end and said externally threaded end, said inclined surface tapered inward from said outer diameter of said ferrule end towards said bore of said ferrule end, said inclined surface having an inner diameter greater than the diameter of the constant diameter external threads, said external threads and said inclined surface formed to threadedly receive and retain an arrow point with cooperating constant pitch and constant diameter internal threads and inclined surface so that impact forces from the arrow point are not transmitted to the inner surface of said circular arrow shaft.

2. A method of making an arrow comprising the steps of:

providing a hollow circular shaft having a first end and a second end and opening with an inner surface defined therethrough,

providing a single piece end adaptor having;

a ferrule end with an outer diameter and a cylindrical bore with a continuous inner surface defined upwardly therein, the inner surface of said bore adhesively engagable about a portion of the first end of said hollow circular shaft; and

an externally threaded end opposite said ferrule end, said externally threaded end having;

constant pitch and constant diameter external threads defined thereabout, and

an inclined surface defined in a circular manner about the intersection of said ferrule end and said externally threaded end, said inclined surface tapered inward from said outer diameter of said ferrule end towards said bore of said ferrule end, said inclined surface having an inner diameter greater than the diameter of the constant diameter external threads, said external threads and said inclined surface formed to threadedly receive and retain an arrow point with cooperating constant pitch and constant diameter internal threads and inclined surface so that impact forces from the arrow point are not transmitted to the inner surface of said circular shaft.

adhesively engaging a portion of said inner surface of said bore of said ferrule end to the first end of said hollow circular shaft,

threading an arrow point on the externally threaded end of said end adaptor, and

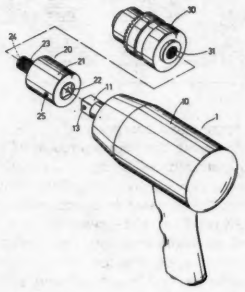
contacting said inclined surface of said arrow point with said inclined surface of said externally threaded end.

4,874,181

COUPLING MEMBER FOR SECURING A DRILLING HEAD TO THE ROTATABLE ROD OF A PNEUMATIC TOOL BODY

Shing-Wang Hsu, No. 51-2, Lane 265, Tai Ping Rd., Tai Ping Hsiang, Taichung Hsien, Taiwan

Filed Aug. 31, 1988, Ser. No. 238,911
Claims priority, application Taiwan, May 31, 1988, 77205185
Int. Cl.[4] B23B 51/12
U.S. Cl. 279—1 A **1 Claim**



1. A coupling member for releasably securing a drilling head (30) to the rotatable rod (11) of a pneumatic tool body (10), said rotatable rod (11) including a coupling end portion of rectangular cross-section, said drilling head (30) comprising a generally cylindrical body having a coupling end surface, a first threaded hole (31) formed axially in said cylindrical body and extending inwardly from said coupling end surface, a second fastener hole (32) of smaller diameter than said first hole formed in said cylindrical body, said fastener hole extending axially inwardly from the end of said cylindrical body opposite said coupling end surface and communicating with said first threaded hole (31), said fastener hole (32) having an enlarged counter bore portion (34) including an outwardly flaring surface at the end of said fastener hole (32) opposite said first threaded hole (31), said coupling member (20) comprising a generally cylindrical main body (21) having a rectangular socket (22) extending axially inwardly at one of its ends for snugly receiving said coupling end portion of said rotatable rod (11), an externally threaded extension (23) projecting from the other end of said coupling member (20) for mating reception in said first threaded hole of said drilling head (30), a threaded hole (24) extending axially into said extension (23) from the free end thereof, and a bolt (40) extending through said second fastener hole (32) of said drilling head (30) and threaded into said threaded hole (24) of said coupling member (20), said bolt (40) including a head whose undersurface tapers to matingly engage said outwardly flaring surface at the end of said fastener hole (32) whereby said drilling head (30) is se-

cured to said coupling member (20) in rigid axial alignment therewith.

4,874,182

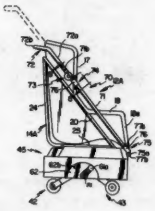
STROLLER APPARATUS FOR JUVENILE CAR SEAT

Gary E. Clark, Sikeston, Mo., assignor to Wade Parker, Sikeston, Mo. and Richard G. Heywood, St. Louis, Mo.

Filed Dec. 28, 1987, Ser. No. 138,198

Int. Cl.[4] B62B 1/04

U.S. Cl. 280—30 **18 Claims**



1. In combination with a juvenile car seat having a supporting base adaped to be positioned on a vehicle seat; a stroller apparatus for converting such car seat into a mobile stroller unit, comprising a base frame encased in a rigid shell housing, mechanical latching means for releasably interlocking the supporting base of said car seat to said base frame of said stroller apparatus, a set of front wheels mounted on said base frame for conjoint movement between an extended stroller position and a retracted car seat position in which said front wheels are recessed within said shell housing, a separate set of rear wheels mounted on said base frame for conjoint movement between an extended stroller position and a retracted car seat position recessed within the shell housing, lever means constructed and arranged for selectively actuating said front and rear wheel sets between said extended and retracted positions, and extensible handle means for said apparatus comprising a pair of elongated lower slide members, an upper handle frame having side members positioned for sliding movement relative to said slide members between an extended operative stroller position and an inoperative car seat position, said side members being interconnected by an upper cross handle member, locking means for releasably locking said slide and side members in said extended stroller position, and mounting means for securing said lower slide members relative to said stroller apparatus base frame, said mounting means comprising angularly related side struts secured to opposite sides of said base frame and being connected by strut plates, said slide members being connected to said strut plates and extending angularly downwardly adjacent to the opposite sides of said base frame.

4,874,183

FOUR-WHEEL STEERING APPARATUS OF A VEHICLE

Isamu Chikuma; Satoru Shimada, and Hiroshi Eda, all of Maebashi, Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 7, 1988, Ser. No. 216,183

Claims priority, application Japan, Jul. 31, 1987, 62-190282

Int. Cl.[4] B62D 7/14

U.S. Cl. 280—91 **6 Claims**

1. A four-wheel steering apparatus of a vehicle comprising:

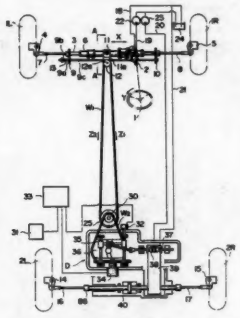
a front-wheel steering mechanism for steering front wheels;

a rear-wheel steering mechanism for steering rear wheels;

a steering gear mechanism operatively connected to said front-wheel steering mechanism and effecting a steering operation;

a steering angle extracting mechanism operatively connected to said steering gear mechanism for extracting the steering angle of the front wheels, said steering angle extracting mechanism comprising a restraining member movable axially along an axis of the front wheels in response to the steering operation, and a string member fixed to said restraining member and displaceable lengthwise in response to the movement of said restraining member; and

rear-wheel steering angle control means operatively connected to said steering angle extracting mechanism for controlling the amount and the direction of steer to be transmitted to the rear wheels, said rear-wheel steering angle control means comprising a rotatable member rotatable on a center of rotation in response to the displacement of said string member and having an arcuate guide portion of predetermined curvature, a slider member slidable along said guide portion to determine a steering ratio and the direction of the rear wheels with respect to the front wheels, and means including a transmission member engaged with said slider member and shiftable in accordance with the amount and the direction of rotation of said rotatable member and the position of said slider member along said guide portion for controlling said rear-wheel steering mechanism.



4,874,184

TRAILER

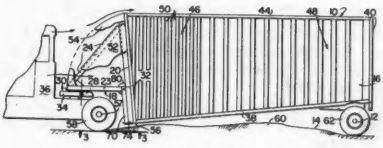
John D. Boyer, Riverside, Calif., assignor to Road Systems, Inc., Fontana, Calif.

Continuation of Ser. No. 798,843, Nov. 18, 1985, abandoned.

This application Mar. 21, 1988, Ser. No. 175,689

Int. Cl.[4] B62D 53/06, 63/06

U.S. Cl. 280—423.1 **15 Claims**



1. A roadway trailer for towing by a tractor truck and having a front, a rear and a body structure including side walls, the trailer comprising:

an underframe supporting the body structure,

a generally flat floor rigidly secured to the underframe,

side walls of the body structure extending generally upwardly from the underframe, said side walls having upper edges and having their front portions substantially taller than their rear portions,

at least one rear axle connected to the underframe and carrying wheels to support the trailer on the roadway, and

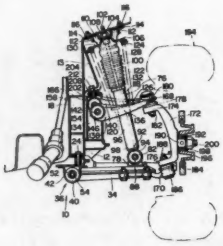
hitch attachment means connected to the front of the trailer at a hitch point disposed substantially above the underframe, the underframe and floor inclining downwardly toward the trailer front and said side walls upper edges being generally horizontal when the hitch point is connected for towing of the trailer by the tractor truck.

4,874,185

VEHICLE SUSPENSION SUPPORTING CONSTRUCTION

Takao Kijima, Hiroshima, and Takeshi Edahiro, Higashihiroshima, both of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jul. 7, 1988, Ser. No. 216,651
Claims priority, application Japan, Jul. 7, 1987, 62-104199
Int. Cl.[4] B60G *3/00, 3/20*
U.S. Cl. 280—690 **20 Claims**



1. A suspension supporting construction for supporting a vehicle suspension apparatus having a wheel supporting member for supporting a wheel of a vehicle for rotation, upper and lower arms pivotally mounting upper and lower ends of the wheel supporting member, respectively, and a suspension supporting member for supporting the upper and lower arms for swingable motion so as to allow said wheel supporting member to move up and down relatively to a car body of said vehicle, said suspension supporting member comprising:

a cross member extending over the width of said car body and resiliently connected to said car body;

a supporting frame formed as an integral part of said cross member and extending upward from said cross member for pivotally mounting an inner end of said upper arm; and

a connecting mount through which said supporting frame is resiliently connected to said car body.

4,874,186

PAPER SHEETS BINDING SYSTEM

Charles T. Groswith III, Los Altos; Edwin A. Seipp III, Menlo Park; Rickson Sun, and James R. Yurchenco, both of Palo Alto, all of Calif., assignors to Taurus Holdings, Inc., Mountain View, Calif.

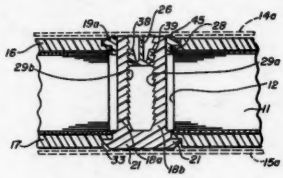
Filed Nov. 13, 1987, Ser. No. 120,069
Int. Cl.[4] B42D *1/00*; B42F *13/30, 3/00*; F16B *35/04*
U.S. Cl. 281—28 **26 Claims**

1. An apertured paper sheets binding connector comprising:

a binding member including a pair of elongated parallel posts integrally extending from a common head, each of said posts including inwardly facing ratcheted surfaces extending from a planar inner surface and oppositely-disposed flat outwardly-facing surfaces parallel to said planar inner surface;

a locking collar having a pair of matching throughapertures, an integral medial cross-bar extending between and separating said apertures, and at least one pawl hingedly mounted to said cross-bar, said apertures including oppositely-disposed peripheral flat sections, corresponding to and allowing sliding passage of said posts outwardly facing flat surfaces therepast;

wherein said posts are insertable into at least one paper sheet aperture from one side of a stack of paper sheets and through said locking collar, said locking collar including a head juxtaposed to a paper sheet aperture on an opposite side of said stack of paper sheets; and



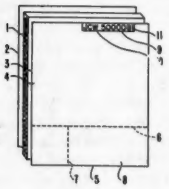
wherein said at least one pawl ratchets along said at least one of said ratcheted surfaces until said posts flat head and said locking collar head clamp said paper sheets together; excess length of said posts being breakable across a cross section of said posts from a root of said ratchet surfaces across said posts to said posts flat surfaces generally in a plane of an exterior surface of said locking collar head.

4,874,187

INSURANCE FORM PACKET

Fredrick Schaufeld, Washington, D.C., assignor to National Electronics Warranty Corporation, Washington, D.C.

Filed Oct. 6, 1987, Ser. No. 105,045
Int. Cl.[4] B42D *15/00, 15/02*; B65D *85/00*; A47B *97/02*
U.S. Cl. 283—70 **11 Claims**



1. An insurance form comprising:

two sheets of printed information at both sides of a stiff support, at least one of said sheets having at least one line of weakening;

said stiff support material of at least about ⅛ inch thickness with deformable edges of at least the same size as said two printed sheets, and

a transparent or substantially transparent viewing enclosure means for restraining said two sheets of printed information against said support material and for viewing at least a portion of said information.

4,874,188

FIDUCIARY OR SECURITY OBJECT ENABLING VISUAL OR OPTICAL AUTHENTIFICATION

Philippe Gravisse, Paris; Jacques Duchateau, Recquignies, and Maurice Perron, Viroflay, all of France, assignors to B.R.I.C.-Bureau de Recherche pour l' Innovation et la Convergence & Banque de France, Paris, France

Filed Oct. 8, 1987, Ser. No. 105,741
Claims priority, application France, Oct. 10, 1986, 86 14161
Int. Cl.[4] B42D *15/00*
U.S. Cl. 283—89 **15 Claims**

1. A fiduciary or security object having optical characteristics enabling its identification and rendering difficult its repro-

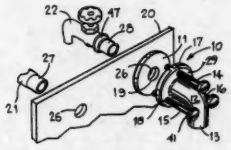
duction, comprising on at least one part, an organic matrix selected from the group consisting of resins of the acrylic, vinyl, silicon, polymethylmethacrylate (PMMA), polyethylene and polyamide types; incorporating in said organic matrix at least one sparkling doping material with short remanence and at least one photoluminescent doping material with long-lasting remanence forming a light cascade which absorbs solar radiation and re-emits radiation at a first predetermined wavelength, absorbs an ultraviolet radiation and re-emits, radiation at a second predetermined wavelength, and, after exposure to said radiation, emits radiation at a third predetermined wavelength, said doping materials being selected from the group consisting of photoluminescent cyclic aromatic compounds and crystals of sulfide or tungstate doped with one element selected from the group consisting of copper, cobalt, manganese, silver, bismuth, europium and terbium--.

4,874,189

ADJUSTABLE SPACER DEVICE

Geno P. Gardner, 43 Willow Street, Mystic, Conn. 06355

Filed Mar. 23, 1987, Ser. No. 29,651
Int. Cl.[4] F16L *41/00*
U.S. Cl. 285—39 13 Claims



1. An adjustable spacer device constructed and arranged to aid in the alignment and connection of a water supply pipe to a faucet fixture and for adjustably securing the faucet to the rear of an installed and difficult to reach vertically disposed sink portion, said adjustable spacer device comprising:

a) a flanged elbow conduit of a predetermined diameter having an inlet end and an outlet end, said elbow conduit having a circumferentially disposed flange at said outlet end and having a plurality of spaced and threaded apertures therethrough,

b) a plurality of threaded bolt members for the adjustable threading through said plurality of threaded apertures, said bolt members each having an elongated threaded bottom portion and an end portion for turning said bolt members, said threaded portion of each said bolt member being threaded through said elbow flange a predetermined outward distance with respect to said flanged elbow outlet end, and

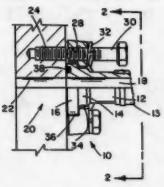
c) an annular rigid plate member parallel spaced from said elbow conduit flange and having opposing faces, one face being for abutment with said threaded bolt member ends and said other face being for engaging only the back portion of the vertical sink portion, said plate member having a centrally disposed aperture therethrough having a diameter generally equal to the diameter of said elbow conduit and being for the communicative extension of the faucet fixture therethrough whereby, said device is initially adjustable by means of said bolt members with respect to said annular plate member and said elbow conduit to align said device with the faucet fixture and the water supply pipe.

4,874,190

SPECIALIZED HOSE CONNECTOR FOR CONNECTING HYDRAULIC HOSES AND PORTS OF DIFFERENT RATINGS

David W. Reynolds, Huxley, Iowa, assignor to Sundstrand Corporation, Rockford, Ill.

Filed Jan. 11, 1988, Ser. No. 142,107
Int. Cl.[4] F16L *23/00*
U.S. Cl. 285—158 7 Claims



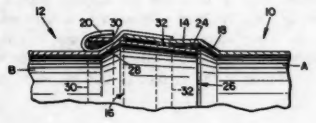
1. A connector for connecting a fluid conduit of a first code standard to a fluid port of a second code standard different than said first code standard and wherein said fluid conduit has a flange head dimensioned according to said first code standard, said fluid port is dimensioned according to said second code standard, said connector having an opening dimensioned according to said first code standard for receiving said fluid conduit flange head, and said connector having securing means positioned according to said second code standard and being adapted for connecting said connector to said fluid port.

4,874,191

FLUE GAS CONDUIT CONNECTOR

Lloyd C. Green, Greenfield, Mass., assignor to Heat-Fab, Inc., Greenfield, Mass.

Filed May 22, 1989, Ser. No. 354,878
Int. Cl.[4] F16L *25/00*
U.S. Cl. 285—332.3 1 Claim



1. A flue gas conduit connector for joining together the ends of first and second flue gas conduits comprising:

a first annular female tapered end joint on the end of the first flue gas conduit,

a second complemental annular male tapered end joint on the end of the second flue gas conduit, and abutment means provided intermediate said second and end and said second tapered end joint,

a resilient sealing gasket on the outer periphery of the second male tapered end joint,

a plurality of locking tabs secured to the outer periphery of the first female tapered end joint and having free ends extending substantially-horizontally outwardly therefrom at spaced intervals therearound,

a locking ring loosely sleeved on the first flue gas conduit adjacent the second male tapered end joint,

the second tapered end joint being of appropriate size and configuration as to mate snugly with the first tapered end joint when the ends of the first and second flue gas conduits are brought into face-to-face confrontation, with the free ends of the locking tabs passing over said abutment means and below the locking ring, whereby when the free ends of the locking tabs are bent back upon themselves over the locking ring, said locking tabs engage said abut-

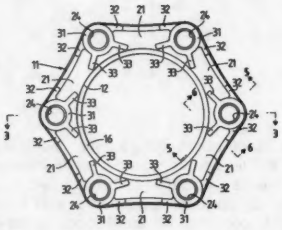
ment means and the first and second tapered end joints are pulled together with the sealing gasket providing a leak-proof seal between the tapered end joints and providing a flue passage uncorrupted by low alloy fasteners.

4,874,192

PIPE JOINT GLAND REINFORCING STRUCTURE

Kenneth W. Key, 2609 Old Gadsden Hwy., Anniston, Ala. 36206

Filed Jun. 15, 1988, Ser. No. 207,171
Int. Cl.[4] F16L *19/03*
U.S. Cl. 285—337 **8 Claims**



1. A pipe joint gland for forming an effective seal and preventing the separation of pipe sections comprising:

(a) an annular web-like structure extending about said pipe section, having a substantially uniform thickness and being generally planar;

(b) wall-like portion extending downwardly and inwardly of said web-like structure about said pipe section;

(c) a plurality of evenly spaced bosses formed on the circumference of and extending above said web-like structure, each having a bolt hole therethrough;

(d) a pair of downwardly sloping reinforcing ribs extending circumferentially on either side of each of said bosses along the periphery of said web-like structure; and

(e) a second pair of downwardly sloping reinforcing ribs extending radially from each said boss with each rib of each pair being bisected by a radius of said pipe joint gland wherein each reinforcing rib tapers from the top of an associated boss to the surface of said web-like structure.

4,874,193

HEAT-RECOVERABLE COMPOSITION COUPLING DEVICE

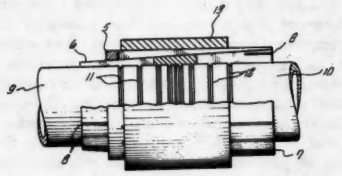
Charles L. Martin, Palo Alto, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Continuation of Ser. No. 552,711, Nov. 17, 1983, abandoned, which is a division of Ser. No. 29,212, Apr. 12, 1979, Pat. No. 4,455,041, which is a continuation of Ser. No. 608,206, Aug. 22, 1975, abandoned. This application Jun. 23, 1986, Ser. No. 878,525
Claims priority, application Sweden, Apr. 9, 1975, 75040709
Int. Cl.[4] F16L *17/02*
U.S. Cl. 285—369 **33 Claims**

1. A composite device for securely engaging at least one substrate which comprises:

(a) at least one tubular, heat-recoverable, metallic compression sleeve; and

(b) at least one tubular, metallic insert snugly and concentrically disposed within, adjacent to, and in contact with the compression sleeve so that when the compression sleeve is heated above its transition temperature, the insert is altered in at least one of its dimensions and is driven inwardly by the heat-recovered sleeve for securely engaging and forming a gas-tight seal with the substrate, the insert having an inner surface and an outer surface, the inner surface of said insert being tapered and the diameter of the outer surface being substantially constant, wherein



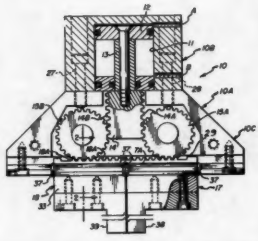
said insert is structurally weakened to facilitate its deformation by said sleeve.

4,874,194

GRIPPER DEVICE

Nicky Borcea, 95 Steep Hill Rd., Weston, Conn. 06883, and Alexandru D. Ionescu, 190 Sport Hill Rd., Easton, Conn. 06612

Filed Jun. 28, 1988, Ser. No. 212,483
Int. Cl.[4] B25J *15/08*
U.S. Cl. 294—88 **2 Claims**



1. A robotic gripping device comprising

a housing,

means defining a cylinder included on said housing,

a piston disposed in said cylinder,

a piston rod connected to said piston,

a double edge rack connected to said piston rod,

a spur gear disposed in meshing relationship with each edge of said rack whereby said spur gears are actuated in unison,

a track means connected to said housing defining a guideway,

a pair of rack carriages disposed in said guideway,

each of said rack carriages being in meshing relationship with one of said spur gears,

roller bearing means disposed between said track means and said rack carriages within said guideway,

finger grippers connected to each of said rack carriages for movement toward and away from one another upon actuation of said piston,

said finger grippers being disposed in co-axial alignment,

wherein said track means comprises

a pair of opposed rail members,

said pair of rail members having spaced apart edge portions defining said guideway therebetween,

each of said edge portions having angularly disposed surfaces,

each of said rack carriages having opposed end portions and longitudinal side portions, said side portions, having angularly disposed surfaces complementing the angular sur-

faces of said rail members and disposed contiguous therewith,

said bearing means being disposed between said complementary angular surfaces of said rail members and said complementing angular surfaces of said rack carriages whereby said rack carriages are disposed in rolling engagement with said rail members,

end stops connected to the opposed end portions of said rack carriages,

said end stops extending laterally of said angular surfaces of said rack carriages, and

said end stops containing said bearing means therebetween whereby said bearing means moves in unison with said rack carriages,

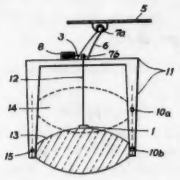
wherein said bearing means comprises an elongated cage having angularly disposed sides, and a plurality of roller bearings maintained in longitudinally spaced relationship on each side of said cage, whereby the roller bearings are disposed in rolling engagement with the corresponding angular surfaces of said rail members and complementary angular surfaces of said rack carriages.

4,874,195

ANTI-GLARE SHIELD FOR THE FRONT WINDSHIELD OF CARS

Chih-Hsiung Lu, 4th Fl, No. 5, Lane 306, Kung Kuan Rd., Pei-tou, Taipei, Taiwan, and Jill H. Lu, 907 Manley Dr., San Gabriel, Calif. 91776

Filed Jul. 5, 1988, Ser. No. 219,728
Int. Cl.[4] B60J *3/02*
U.S. Cl. 296—97.4 **5 Claims**



1. An anti-glare shield for a front windshield of a car comprising: an anti-glare glass having a central portion of an upper edge of said glass suspendingly secured to a shaft of a DC motor by a cable, said glass having two side edges slidably engaged with a pair of transparent vertical frames disposed on two opposite sides of said glass, said glass suspended under said cable being generally perpendicular to said cable, said DC motor mounted on an upper portion of said transparent frames, a photocell installed on one of said pair of transparent frames for actuating said motor, so as to slide said anti-glare glass, and two microswitches installed on the other of said pair of transparent frames for stopping a running of said motor, thereby stopping a sliding movement of said anti-glare glass.

4,874,196

TRUCK COVER HAVING AN IMPROVED TELESCOPIC ARM ASSEMBLY

Harvey R. Goldstein, and Edward N. Haddad, Jr., both of Worcester, Mass., assignors to Pioneer Consolidated Corp., North Oxford, Mass.

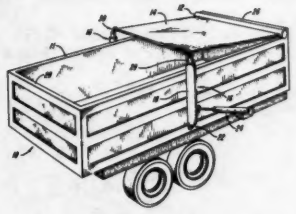
Filed Jun. 18, 1987, Ser. No. 63,524
Int. Cl.[4] B60P *7/04*; E04F *10/06*
U.S. Cl. 296—98 **22 Claims**

1. Apparatus for drawing a flexible cover over an upwardly open container body having an upper edge and for maintaining loose articles in said container body, said apparatus comprising:

a flexible cover of a size substantially cover the open container body;

a pair of telescopic arms pivotally attached at one end to the container and connected at the other end to the cover, constructed and arranged to maintain the cover in close proximity to said upper edge;

means for pivotally moving said telescopic arms to cause said connected ends to traverse from one end of the container body to an opposite end; and



means for retracting said telescopic arms during pivotal movement from one end of the container body to a first pivotal position and for extending said telescopic arms during pivotal movement from the first pivotal position to the opposite end of the container body, wherein

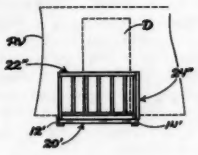
a minor portion of said telescopic arms extends above said upper edge at any intermediate pivotal position between said one end and said opposite end of the container body.

4,874,197

RETRACTABLE PORCH FOR MOBILE HOMES

Robert G. Grable, P.O. Box 1163, Calusa, Calif. 95932

Filed Oct. 25, 1988, Ser. No. 262,349
Int. Cl.[4] B60R *3/02*
U.S. Cl. 296—162 **1 Claim**



1. A retractable porch for mobile homes, comprising: a pair of spaced parallel frame rails for securement to a frame, below a door, on an underside of a mobile home;

said frame rails formed from channel beam members having facing channels forming a guide track;

a pair of centrally intersecting diagonal brace struts extending between said frame rails;

a generally rectangular porch platform supported on a porch frame;

said porch frame having parallel side members terminating in attachment strut members dimensioned for insertion into said frame rail channels;

said attachment strut member each having roller bearings for guiding said porch platform for reciprocal sliding movement in said guide track for movement between extended and retracted positions;

a first vertically extending stationary side porch railing extending perpendicular to said porch side members;

a second side porch railing mounted by hinges on said porch frame for movement between collapse horizontal and vertical extended positions;

retractable legs on an underside of said porch platform; and

said first side porch railing disposed adjacent said mobile home door and said second side porch railing disposed

beneath said mobile home when said porch platform is in a retracted position in said guide track.

4,874,198

COVER STRIP FOR THE LOWER EDGE OF A BONDED WINDSCREEN OF A MOTOR CAR

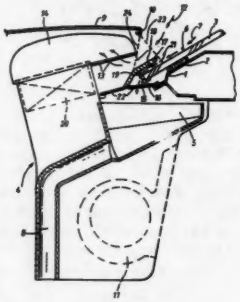
Traugott Roller, Wildberg, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Oct. 26, 1988, Ser. No. 262,598

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1987, 3736780

Int. Cl.[4] B60J *1/02*

U.S. Cl. 296—192 **9 Claims**



1. Cover strip arrangement for the lower edge of a bonded windscreen of a motor car, wherein the cover strip is located in the air suction region of a blower which sucks external air through between an external surface of the windscreen and a rear edge of an engine hood into an air filter located beneath the engine hood, wherein the cover strip is located in the discharge path of a stream of water being discharged along the external surface of the windscreen and is arranged to maintain an interval from the external surface of the windscreen and maintains a sufficient interval from the engine hood for the air suction, and wherein the cover strip is anchorable to the windscreen by means of clips arranged at a mutual interval and forms with the windscreen a passage duct which introduces the stream of water into a water catching tank adjacent to a lower edge of the windscreen.

4,874,199

POWER-DRIVEN COWL FOR AN AUTOMOTIVE VEHICLE

Takeshi Yamamoto, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Oct. 19, 1987, Ser. No. 109,890

Claims priority, application Japan, Oct. 17, 1986, 61-245185; Oct. 17, 1986, 61-245186

Int. Cl.[4] B62D *25/08*; B60S *1/04*

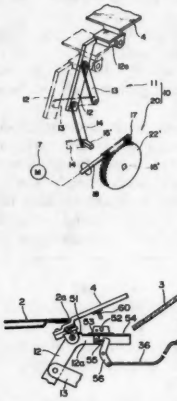
U.S. Cl. 296—192 **9 Claims**

1. A power-driven cowl for an automotive vehicle having a cowl panel which is shiftable between a closed position wherein said cowl panel closes a spaced formed between the rear end of an engine hood panel and a front windshield glass to cover a front windshield wiper housed in said space, and an open position wherein said cowl panel open said space to uncover said front windshield wiper so as to allow it to operate, said power-driven cowl comprising:

mounting means mounting said cowl panel for pivotal movement;

motor driven cowl shifting means coupled to said mounting means for moving said mounting means downwardly and forwardly relative to said hood so as to shift said cowl panel between said closed and open positions;

cowl driving means mounted on said mounting means for causing said cowl panel, when said cowl panel is in said closed position covering said front windshield wiper, to pivotally move to uncover said front windshield wiper, said mounting means being stationary during the pivotal movement; and



locking means disposed between said mounting means and said cowl panel for releasably locking said cowl panel at said covering position.

4,874,200

MODULAR VEHICLE BODY

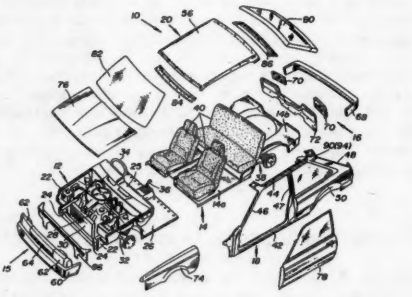
Tetsuji Nasu, Yokohama, and Jun Shiina, Zama, both of Japan, assignors to Nissan Motor co., Ltd., Yokohama, Japan

Filed Mar. 29, 1988, Ser. No. 174,914

Claims priority, application Japan, Mar. 30, 1987, 62-77206

Int. Cl.[4] B62D *25/00*

U.S. Cl. 296—197 **6 Claims**



1. A vehicle body structure comprising:

an engine compartment assembly having a cowl box and a ddash lower panel at the rear end thereof;

a floor assembly having a front floor panel and a rear floor panel;

a pair of body side assemblies each having a front pillar, rear pillar, roof side rail and a side still;

a roof assembly having a roof panel;

said engine compartment assembly, floor assembly, body side assemblies and roof assembly constituting indepen-

dent vehicle body sections which are prepared and painted independently;

mechanical fastening means for mechanically fastening said engine compartment assembly, floor assembly, body side assemblies and roof assembly together; and

grounding means for electrically connecting said engine compartment assembly, floor assembly, body side asemblies and roof assembly to each other.

4,874,201

SUPPORT AND GUIDE STRUCTURE FOR THE WINDOWS OF A MOTOR VEHICLE BODY

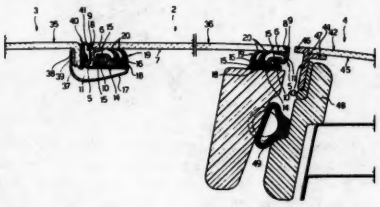
Oscar Scaglietti, Montale di Castelnnovo Rangone, Italy, assignor to Ferrari Engineering S.p.A., Modena, Italy

Filed Jun. 16, 1988, Ser. No. 207,247

Claims priority, application Italy, Jun. 16, 1987, 67512 A/87

Int. Cl.[4] B60J *5/04*

U.S. Cl. 296—201 **11 Claims**



1. A support and guide structure for the windows of a motor vehicle body having at least one door (1) with a substantially vertically movable window (2) which is delimited by a pair of lateral edges (8) and an upper edge (26), characterised by the fact that it comprises a pair of window support elements (5) of elongate form and constant cross-section, each of which comprises an abutment tongue (6) to be fixedly fastened to a part of the rear surface (7) of the window contiguous to one of the said lateral edges, a frame tongue (9) orthogonal to the abutment tongue and adapted to surround the said lateral edge of the window, a guide tongue (10) parallel to the said abutment tongue and disposed rearwardly of it and projecting towards the central part of the said window, and a connection wall (11) connecting together the said abutment tongue and the said guide tongue; a pair of guide elements (14) of elongate form and constant U-shape cross-section, each of which is adapted to guide a corresponding support element during movement of the window, and each of which comprises a pair of parallel guide tongues (15), defining with a base wall (16), a guide channel for the said guide tongue of a corresponding support element, each of the said guide elements being fixed to a corresponding upright (17) of the said door.

4,874,202

SLIDING TYPE SUNROOF LIFT DOWN DEVICE

Hironori Ochiai, Nagoya; Etsuo Suzuki, Miura, and Kazuo Ikuta, Hiratsuka, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi and Kanto Jidosha Kogyo Kabushiki Kaisha, Kanagawa, both of, Japan

Filed Apr. 28, 1988, Ser. No. 187,243

Claims priority, application Japan, Apr. 30, 1987, 62-107541

Int. Cl.[4] B60J *7/10*

U.S. Cl. 296—222 **3 Claims**

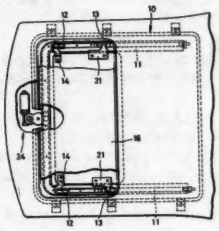
1. A sliding type sunroof for a vehicle, comprising:

a pair of rails;

a pair of front shoes, each of said front shoes being slidably retained in a corresponding one of said pair of rails;

a sunroof panel operatively connected to said pair of front shoes and selectively positioned between a closed position and an open position, said open position being defined by a gap extending inwardly along an exterior of the vehicle, said sunroof panel being supported by said front shoe and being slidable together with said front shoe between said open and said closed position; and

a lift down device including a bracket pivotally connected to said front shoe at a pivot point, said sunroof panel being secured to said lift down device at said pivot point, said bracket being rotatable about said pivot point to slide said front shoe and thereby space said sunroof panel inwardly



relative to the exterior of the vehicle in said open position, said liftdown device including a rear bracket and a rotatable link, said rotatable link being pivotally connected to a rear shoe slidably retained in each of said rails, said rotatable link being rotated by slidable movement of said sunroof panel, each of said rails having a front edge disposed beneath said corresponding one of said front shoes, said pivot point of said front bracket extending beyond said front edge of each of said rails.

4,874,203

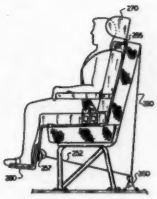
VEHICLE PASSENGER SEAT FOR HANDICAPPED PERSONS

Alvera S. Henley, Rte. 23, Box 398, Newland, N.C. 28657

Continuation-in-part of Ser. No. 892,708, Aug. 1, 1986, abandoned, which is a continuation-in-part of Ser. No. 748,018, Jun. 24, 1985, abandoned. This application Mar. 7, 1988, Ser. No. 164,890

Int. Cl.[4] A47C *15/00*; A61G *5/00*

U.S. Cl. 297—250 **3 Claims**



1. A vehicle passenger safety seat for handicapped persons; said seat being of the type which can be detachably but securely mounted over an existing conventional van, bus, or other such vehicle seat, and comprising:

(a) a supporting frame having a vertical back member and a rigidly attached seat member, said back member further including a first retaining means associated with said back member for engagement over, across, and a prescribed distance downwardly behind the top of the vehicle seat to prevent said safety seat from tilting forwardly;

(b) said first retaining means comprising:

(i) a first pair of retractable straps extending, one on either side, from the upper area of said back member; each of said straps including a clasp on the free end thereof;

(ii) latch means secured to the floor of the vehicle at a

position substantially in alignment with the rear of the mid portion of the vehicle seat, for receiving and locking said clasps therein;

(c) a second retaining means for further securing said safety seat in position on the frame of the vehicle seat; said first and second retaining means cooperating to prevent forward or backward tilting or lateral movement of said safety seat;

(d) a cushion member overlying said back and seat members;

(e) a pair of arms rests movably attached one on either side of said vertical back member for supporting the arms of the passenger;

(f) vertically adjustable foot support means mounted in the front of said seat member for supporting the feet of the passenger;

(g) said second retaining means comprising:

(i) a second retractable strap extending from the rear face of said foot support means and including a clasp on the free end of said strap for engagement in said latch means;

(h) harness means for securing the passenger in said safety seat;

whereby said safety seat can be selectively positioned on the the seat of a van or bus, with said first retaining means over the top of the vehicle seat and said second retaining means securely fastened beneath the vehicle seat, for the safe transport of the handicapped passenger.

4,874,204

HINGE JOINT FOR USE IN THE SEATS OF MOTOR VEHICLES

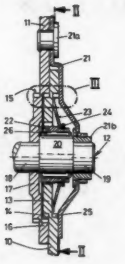
Hansjörg Walk, Reutlingen, Fed. Rep. of Germany, assignor to Keiper Recaro GmbH & Company, Remscheid, Fed. Rep. of Germany

Filed Jun. 24, 1988, Ser. No. 211,364

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1987, 3723710

Int. Cl.[4] B60H *1/02*

U.S. Cl. 297—362 **11 Claims**



1. A hinge joint, particularly for movably connecting the back rest with the body-supporting part of a seat for use in a motor vehicle, comprising a pintle having at least one first portion and at least one second portion eccentric to said first portion; a first component surrounding the first portion of said pintle and having a first gear; a second component surrounding the second portion of said pintle and having a second gear mating with said first gear, one of said gears surrounding the other of said gears and said one gear having n+m teeth wherein n is the number of teeth on said other gear and m is a whole number including one; a sleeve axially movably surrounding one portion of said pintle; and means for maintaining said gears in mesh including a biasing member reacting against said sleeve and bearing axially and radially against one of said components, one of said components being connectable with the body-supporting part and the other of said components being connectable with the back rest.

4,874,205

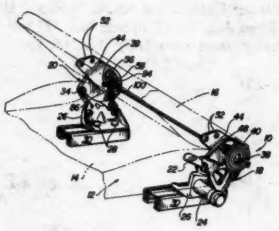
RECLINER ASSEMBLY FOR VEHICLE SEAT

Majid Arefinejad, Southfield; Dennis J. Brothers, St. Clair Shores, and Frederick Kosinski, Royal Oak, all of Mich., assignors to Semec, Inc., Troy, Mich.

Filed Apr. 11, 1988, Ser. No. 179,739

Int. Cl.[4] B60N *1/02*

U.S. Cl. 297—379 **7 Claims**



1. A recliner assembly for a seat having a backrest which is movable between a generally upright position, a fully reclined forward position, and a fully reclined rear position, said recliner assembly comprising:

a stationary plate;

a moving plate rotatably mounted to said stationary plate, said moving plate connected to said backrest, and means for rotating said moving plate and backrest in a first direction toward said fully reclined forward position;

said moving plate includes a recessed area having an edge and said stationary plate includes an opposed recessed area, actuator means contained between and enclosed within the recessed areas for movement therein, and means for biasing said actuator means into engagement with the edge of the recessed area in said moving plate;

means for moving said actuator means out of engagement with the edge of the recessed area in said moving plate when said backrest is in said generally upright position wherein said backrest automatically rotates in said first direction to said fully reclined position in response to said rotating means;

said backrest being selectively manually movable in a second direction from said generally upright position toward said fully reclined rear position when said actuator means is moved out of engagement with the edge of the recessed area in said moving plate; and

means for maintaining a spaced relationship between said actuator means and the edge of the recessed area in said moving plate throughout the movement of said backrest from said generally upright position to said fully reclined forward position and from said fully reclined forward position to said generally upright position;

wherein said actuator means includes a pawl member, said biasing means for said actuator means includes a cam member engaging said pawl member, said cam member mounted on a camshaft, said pawl member having a toothed portion along an edge thereof, said edge of the moving plate recessed area having a toothed portion, said spring means connected to said camshaft for normally biasing the toothed portions into engagement with one another;

wherein said moving means includes a lever connected to said camshaft for applying a rotative force to said camshaft which is opposite to the rotative force being applied to said camshaft by said spring means;

wherein said means for maintaining a spaced relation includes means for permitting translational movement of

said camshaft and an irregularly shaped opening within the recessed area of said moving plate which engages said camshaft for moving the toothed portions apart during movement of said moving plate.

4,874,206

TIRE WHEEL AND WHEEL COVER SPRAY SHIELD AND KIT

Thomas J. Sampson, 10514 Aqueduct Ave., Granada Hills, Calif. 91344

Filed Dec. 7, 1987, Ser. No. 129,232
Int. Cl.[4] B05C *11/16*; B60B *7/00*
U.S. Cl. 301—37 R 5 Claims

2. An improved removable tire wheel and wheel cover spray shield, said shield comprising, in combination:

(a) a generally cylindrical disc;

(b) a handle connected to the outer face of said disc;

(c) securing means connected to the inner face of said disc for releasably securing said disc over the outer face of a tire wheel or wheel cover to protect the same during spraying of a tire bearing the same,

(d) wherein said disc is generally flat and said securing means comprises an annular wheel and sheel cover rim-gripping hook projecting inwardly from said inner disc face, and

(e) wherein said disc includes a plurality of peripheral concentric circular score lines dividing the periphery of said disc into a plurality of concentric rings, and a plurality of concentric peripheral hooks on the inner face of said disc at the level of said score lines, whereby the diameter of said disc can be decreased by breaking away one or more of said rings from the remainder of said disc.

4,874,207

HYDRAULIC BRAKING SYSTEM FOR AN AUTOMOTIVE VEHICLE

Michiharu Nishii; Masamoto Ando, both of Toyota, and Yoshihiko Tada, Aichi, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jun. 27, 1988, Ser. No. 214,373
Claims priority, application Japan, Jun. 27, 1987, 62-160113; Aug. 13, 1987, 62-202249; Aug. 13, 1987, 62-202252; Aug. 13, 1987, 62-202253
Int. Cl.[4] B60T *8/44*
U.S. Cl. 303—52 16 Claims

1. A hydraulic braking system for an automotive vehicle, comprising:

a power source for generating a hydraulic power pressure;

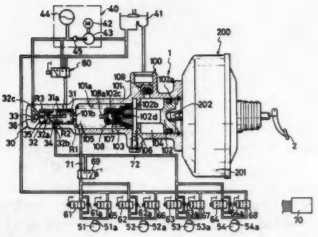
a reservoir for storing an amount of hydraulic fluid;

a master cylinder having a housing defining therein a bore, a master piston slidably disposed in said bore to form a pressure chamber for introducing said hydraulic fluid thereinto from said reservoir and generating a hydraulic braking pressure in response to depression of a brake pedal;

a regulator having a housing defining therein a regulator chamber for introducing said hydraulic power pressure thereinto from said power source and regulating said hydraulic power pressure into a regulated hydraulic pressure in response to said hydraulic braking pressure generated in said master cylinder, said regulator being positioned in substantially coaxial relationship with said master cylinder and responsive mechanically to depression of said brake pedal;

said regulator being arranged to control the communication of said regulator chamber with said power source and said reservoir normally in response to said hydraulic braking pressure generated in said master cylinder, and in response to depression of said brake pedal when said hydraulic braking pressure generated in said master cylinder is less than a predetermined value;

a plurality of wheel brake cylinders for braking respective road wheels, said wheel brake cylinders being divided into a first group of wheel brake cylinders communicated with said pressure chamber of said master cylinder and a second group of wheel brake cylinders communicated with said regulator chamber,



said regulator comprising a housing defining therein a bore coaxial with said pressure chamber of said master cylinder, a piston axially slidably disposed in said bore of said regulator to form a regulator chamber therein, and valve means disposed within said regulator chamber for controlling the communication of said regulator chamber with said power source and said reservoir in response to movement of said piston, said piston being applied at one end thereof with a hydraulic pressure in said regulator chamber and at the other end thereof with said hydraulic braking pressure in said master cylinder, said valve means normally allowing a flow of said hydraulic fluid from said reservoir into said regulator chamber, and said valve means inhibiting the flow of said hydraulic fluid from said reservoir and introducing said hydraulic power pressure into said regulator chamber when said hydraulic braking pressure in said master cylinder exceeds said hydraulic pressure in said regulator chamber.

4,874,208

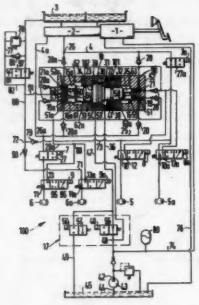
ANTI-SKID CONTROL SYSTEM

Heinz Siegel, Stuttgart, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 13, 1989, Ser. No. 322,462
Claims priority, application Fed. Rep. of Germany, Jun. 10, 1988, 3819812
Int. Cl.[4] B60T *8/32, 8/34, 13/12, 17/02*
U.S. Cl. 303—116 20 Claims

1. An anti-skid control system for vehicles, with the wheels of which each respective wheel brake cylinder communicates via a brake line with said multi-circuit master cylinder, at least one first valve assembly associated with one of the anti-skid-controlled wheel and located in a brake line, said at least one valve assembly assumes switching positions in an anti-skid control situation, for at least pressure buildup and pressure reduction; at least one fluid feed device associated with one of the brake circuits, said feed device receives pressure fluid flowing back from said at least one first valve assembly under

pressure reduction conditions and pumps the pressure fluid in a direction of the brake line, a piston pump that serves said at least one feed device (90), said piston pump has an actuating piston (18), which is acted upon by pressure fluid that in an anti-skid control situation is carried in alternation from a control valve assembly (17) into a first or a second hydraulic chamber section (53, 54) disposed each on one side of said actuating piston (18) and in so doing displaces the actuating



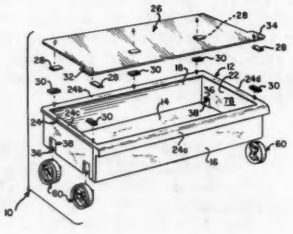
piston (18) such that at least two pump pistons (15, 15*a*; 16, 16*a*) contacting said actuating piston (18) are simultaneously actuated into cylinder chambers (19, 19*a*; 21, 21), which in one displacement direction, upon pressure reduction, aspirates pressure fluid from the wheel brakes into the respective cylinder chamber via check valves (28, 28*a*), and in another displacement direction pumps pressure fluid back into the brake line (4, 4*a*) from the respective cylinder chamber (19, 19*a*; 21, 21*a*) via other check valves (20, 20*a*).

4,874,209

ROLLING DRAWER

Charles M. Spitzer, Roslyn Heights, N.Y., and Paul F. Siegel, Ridgefied, Conn., assignors to A-Bee Syndicate, Inc., New York, N.Y.

Filed Jan. 9, 1989, Ser. No. 294,817
Int. Cl.[4] A47B *91/00*
U.S. Cl. 312—250 **11 Claims**



1. A rolling drawer for storing articles, said drawer comprising;

a drawer-like tray to store the articles including a bottom panel and a pair of upstanding side panels connected to the side edges of said bottom panel, said bottom panel having at least one cut-out opening formed along each of its side edges and said side panels each having an open ended slot communicating with a respective one of said cut-out openings and projecting upwardly therefrom;

at least one pair of wheel assemblies for supporting said tray for rolling movement upon a support suraace, each of said wheel assemblies comprising a wheel and a bracket member;

means for rotatably mounting said wheel to said bracket member;

said bracket member including an elongated plate having a width dimension greater than the corresponding width dimension of said open ended slots; and

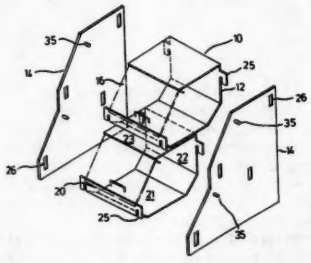
mounting means on said bracket member to removably mount a separate one of said wheel assemblies to each side of said tray, said mounting means configured to pass through one of said cut-out openings and engage the associated side panel when said bracket member is moved upwardly into a mounted position on said side panel.

4,874,210

PRODUCT DISPLAY AND DISPENSING UNIT

Francis A. Carroll, Sandymount, Ireland, assignor to Institute for Industrial Research and Standards, Dublin, Ireland

Filed Jun. 30, 1987, Ser. No. 68,195
Claims priority, application Ireland, Jul. 2, 1986, 1782/86; Belgium, Dec. 30, 1986, 0/217640
Int. Cl.[4] A47B *43/00*
U.S. Cl. 312—257.1 **15 Claims**



1. A product display and dispensing unit comprising at least one compartment for loose products, each compartment comprising a body member and a pair of side panels with pairs of complimentary engageable and disengageable means for fastening together the side panels and the body member, each of said pairs comprising a key fixedly attached to said body member and a slot in a side panel, said key forming an open ended notch that is complementarily engageable and disengageable with said slot, said key being fixedly attached to said body member both prior to and during engagement with said slot, said pairs of complimentary engageable and disengageable means being the only means for fastening together the side panels and the body member.

4,874,211

FOLDABLE UTILITY CABINET

Walter G. Nichols, 2112-F Sunnydale Blvd., Clearwater, Fla. 34675

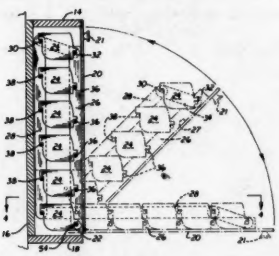
Filed Jan. 11, 1989, Ser. No. 295,842
Int. Cl.[4] A47B *49/00*
U.S. Cl. 312—269 **4 Claims**

1. In a utility cabinet for wall mounting having a frame with a bottom member and hollow interior and a lowerable front door having longitudinal sides and a bottom hinged at its bottom to the bottom of the cabinet frame, the improvement comprising:

a first pair of parallel side support members spaced apart from each other, each side support members integral with an inside surface of the front door, the side support members each located interior to and spaced apart from a longitudinal edge of the front door; a second pair of parallel support members spaced apart from each other hinged to the first pair of side support members and spaced apart from the first pair of side support members in an open

configuration, with the hinges maintaining the first and second pairs in parallel spaced apart relation;

a first set of multiple parallel rods mounted at right angles to and connecting the first side support members; a second set of multiple parallel rods mounted at right angles to and connecting the second pair of side support members;



multiple removable compartments each resting on a rod connecting the first side suppor members and an adjacent rod connecting the second side support members, so that each compartment remains upright whether the front door is in a locked configuration to the cabinet frame or is hinged away from the cabinet frame.

4,874,212

DEVICE FOR FASTENING A FRONT PLATE TO METAL DRAWER SIDE WALLS

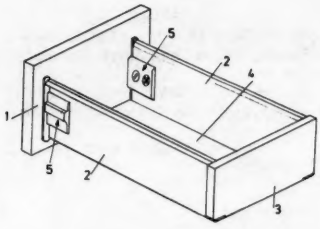
Erich Röck, Höchst, and Klaus Brüstle, Lauterach, both of Australia, assignors to Julius Blum Gesellschaft M.B.H., Höchst, Australia

Filed May 3, 1988, Ser. No. 191,021

Claims priority, application Austria, May 4, 1987, 1103/87

Int. Cl.[4] A47B *88/04*

U.S. Cl. 312—330.1 **8 Claims**



1. A device for use in mounting a drawer front panel to a metal side wall of the drawer, said device comprising:

a block member formed of plastic material and adapted to be attached to a drawer front panel, said block member having therein a groove defined by spaced portions of said block member;

an adjustment plate positioned within said groove;

a projection extending into said groove from one of said portions of said block member or from said adjustment plate;

whereby said block member is fittable over a front end of a drawer metal side wall with the side wall inserted in said groove with said portions of said block member embracing opposite sides of the front end of the side wall, with said adjustment plate adapted to extend into a recess formed in the front end of the side wall and having upper and lower edges to abut upper and lower edges, respectively, of the side wall defining the recess, and with said projection extending into a slot formed in the side wall behind the recess, to thereby form means for initially fastening said block to the side wall;

cooperating means provided on said block member and on said adjustment plate for selectively adjusting the relative vertical position of said block member, and thereby of the front plate, with respect to said adjustment plate, and thereby to the side wall; and

screw means, extending in a direction to be parallel to the front plate and transverse to said groove and adapted to extend through the slot in the side wall, for tightly connecting said portions of said block member to the side wall, and thereby for preventing further vertical adjustment.

4,874,213

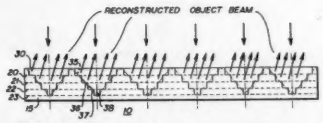
METHOD OF FORMING VOLUME PHASE REFLECTION HOLOGRAMS

James J. Cowan, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 84,568, Aug. 10, 1987. This application Jun. 9, 1988, Ser. No. 204,379

Int. Cl.[4] G03H *1/28*

U.S. Cl. 350—3.67 **12 Claims**



1. A method for forming a volume phase reflection hologram comprising the steps of:

exposing a holographic phase medium by projecting onto one of its surfaces two beams disposed at an angle to one another to form in said medium interference fringes that are substantially perpendicular to said surface and have a predetermined periodicity; and

further exposing said medium with from opposite sides with two more beams to form therein interference fringes that are parallel to said medium surfaces and of finer periodically than that of said predetermined periodicity of said perpendicular fringes so that both said parallel and perpendicular interference fringes combine to provide as exposure pattern in said medium that varies in exposure level both over the surface and depth of said medium in the form of fine generally varying multiple steps distributed depthwise in the medium within a coarser surface pattern.

4,874,214

CLEAR HOLOGRAPHIC HELMET VISOR AND PROCESS OF PRODUCING SAME

Francoise Cheysson, Montrouge, and Jean-Blaise Migozzi, Orsay, both of France, assignors to Thomson-CSF, Paris, France

Filed Apr. 18, 1988, Ser. No. 182,448

Claims priority, application France, Apr. 22, 1987, 87 05702

Int. Cl.[4] G02B *5/32*

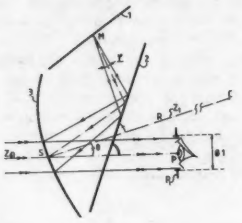
U.S. Cl. 350—3.7 **11 Claims**

1. A holographic visor apparatus comprising:

a generator for producing a light image to be collimated,

an optical collimating and combining assembly including a flat holographic plate and a spherical holographic plate used off-axis and including a holographic element, for providing a view of a collimated image superimposed on a landscape, radiation of the light image being reflected from the flat plate to the spherical plate which produces a collimation of the image at infinity, wherein the holo-

graphic element of the spherical plate is of a type that is determined by means of a computer and recorded by making use of a digital hologram in order to minimize



aberrations and to produce for the field of utilization which is contemplated an exit pupil at a distance substantially equal to the focal distance with respect to the spherical mirror.

4,874,215

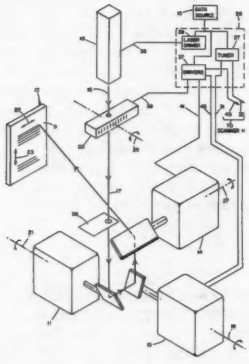
TUNABLE RESONANT MECHANICAL SYSTEM

Jean I. Montagu, Brookline, Mass., assignor to General Scanning, Inc., Watertown, Mass.

Filed Apr. 23, 1987, Ser. No. 41,786

Int. Cl.[4] G02B *26/10*; H02K *33/00, 11/00*; F16K *1/14*

U.S. Cl. 350—6.6 **31 Claims**



1. A resonant mechanical system whose natural resonant frequency can be tuned, comprising

a mass movable within a range of excursion,

a spring structure for urging said mass toward a neutral position within said range of excursion,

said spring structure being comprised of a material whose elastic properties change with temperature over a desired tuning range, and

a tuner for detecting a frequency of said mechanical system, and for controllably varying the temperature of at least part of said spring structure in response to said detected frequency to tune said natural resonant frequency.

4,874,216

VARIABLE-WAVEGUIDE OPTICAL BRANCHING FILTER

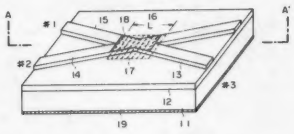
Katsuyuki Utaka, Musashino; Kazuo Sakai, Tokyo; Yuichi Matsushima, Tanashi, and Shigeyuki Akiba, Tokyo, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 23, 1988, Ser. No. 210,640

Claims priority, application Japan, Jul. 2, 1987, 62-163901

Int. Cl.[4] G02B *6/34*

U.S. Cl. 350—96.19 **7 Claims**



1. A variable-wavelength optical branching filter, comprising: two optical waveguides intersecting each other at a predetermined angle, one of the two optical waveguides being employed in use as an input side waveguide for propagating therein incident light, the other of the two optical waveguides being employed as an output side waveguide for obtaining therefrom output light;

a material having a refractive index variable in response to application of input energy to the same and disposed at an intersection of the two optical waveguides;

means for applying said input energy to said material to produce the output light at the output side waveguide;

and a diffraction grating disposed at the intersection of the two optical waveguides for specifying a particular wavelength of the output light by the period of the diffraction grating, and the specified wavelength being variable by changing the refractive index of said material.

4,874,217

LIGHT SOURCE AND DETECTOR PACKAGES

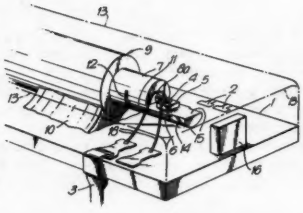
Adrian P. Janssen, Exeter, Great Britain, assignor to STC PLC, London, England

Filed Apr. 8, 1988, Ser. No. 179,395

Claims priority, application United Kingdom, Apr. 21, 1987, 8709315

Int. Cl.[4] G02B *6/42*

U.S. Cl. 350—96.20 **5 Claims**

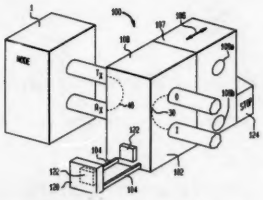


1. A semiconductor optical transmission device comprising: a substrate; a source or detector; an optical fibre optically coupled to the source or detector; a cantilever support structure coextensive with and supporting the fibre; said source or detector being mounted on the free end of said cantilever structure; said structure being cantilevered from said substrate.

4,874,218
REVERSIBLE OPTICAL SWITCH

Terry P. Bowen, Etters; Sherry J. Harms, Hummelstown, and John C. Hoffer, Harrisburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jul. 19, 1988, Ser. No. 221,059
Int. Cl.[4] G02B *6/36*
U.S. Cl. 350—96.20 **7 Claims**



1. An optical switch comprising, a first pair of optical fibers for alignment with an optical coupling, a second pair of optical fibers for alignment with an optical coupling, a first optical coupling for coupling optical fibers of the first pair to corresponding optical fibers of the second pair, a second optical coupling for coupling the optical fibers of the first pair to each other and for coupling the optical fibers of the second pair to each other, and a mechanized assembly for aligning either the first or the second optical coupling with the corresponding optical fibers, wherein the improvement comprises;

the optical fibers of the first pair are aligned with corresponding duplex connectors of a transceiver, and the optical fibers of the second pair are aligned with one end of an interconnect housing having a second end into which are pluggably received a corresponding connector for optical cable in alignment with the duplex connectors and corresponding optical fibers of each pair,

a solenoid for moving the mechanized assembly,

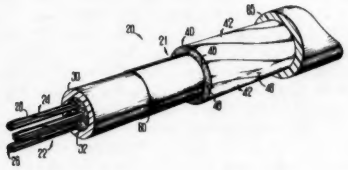
the mechanized assembly includes lenses aligned with corresponding optical fibers of each pair, and

the mechanized assembly includes a pair of waveguides with looped optical paths, each of the looped optical paths being in alignment with a corresponding pair of optical fibers upon movement of the mechanized assembly by the solenoid.

4,874,219
ANIMAL-RESISTANT CABLE

Candido J. Arroyo, Lithonia, and Parbhubhai D. Patel, Dunwoody, both of Ga., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 17, 1988, Ser. No. 194,760
Int. Cl.[4] G02B *6/44*
U.S. Cl. 350—96.23 **22 Claims**



1. An animal-resistant cable, which comprises:

a core which comprises at least one transmission media; and

a sheath system which encloses said core, said sheath system comprising:

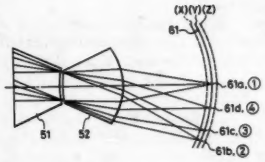
a plurality of longitudinally extending segments each of which has an arcuately shaped cross section transverse to a longitudinal axis of the cable that encloses less than one-half the periphery of said core, and each of which is made of a dielectric material comprising fibers embedded in a matrix that discourages repeated attacks by the same animal and that provides suitable tensile and compressive strength for said cable, said segments cooperating to provide a shell enclosing said core with facing longitudinal edge surfaces of adjacent segments preformed to be substantially contiguous, and said segments being stranded helically about said core and being sufficient in number to allow said cable to be routed in a path having a predetermined radius without damaging said cable; and

an outer jacket comprising a plastic material being disposed about said segments.

4,874,220
VIEWING OPTICAL SYSTEM FOR USE WITH ENDOSCOPE

Masakazu Yamagata, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 17, 1988, Ser. No. 156,633
Claims priority, application Japan, Feb. 17, 1987, 62-21724[U]
Int. Cl.[4] G02B *23/26*
U.S. Cl. 350—96.26 **3 Claims**



1. An endoscope viewing system consisting of in order, a rigid objective lens unit receiving light from an object to be examined under illumination, a flexible optical-fiber image guide transmitting the image of the object focused by said rigid objective lens unit on a light receiving end surface of said optical-fiber image guide, said optical-fiber image guide consisting of a multiplicity of optical fibers fixed in side-to-side, parallel fashion, and a rigid eyepiece for observing the image emerging from a light emerging surface at the opposite end of said image guide from said light-receiving surface, the improvement wherein;

said rigid objective lens unit consists of a first lens imaging a curved image plane conjugate with an object plane; and wherein the light-receiving end surface of the optical-fiber image guide is curved to substantially conform to said curved image plane of said rigid objective lens unit and is positioned at said image plane, such that all parts of said image are in focus at said light-receiving fiber image guide end surface permitting a sharp image of the object to be observed through said rigid eyepiece.

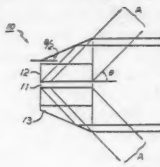
4,874,221
FIBRE-TYPE LIGHT WAVELENGTH CONVERSION DEVICE

Selichi Ohsawa, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed May 1, 1989, Ser. No. 345,162
Claims priority, application Japan, Oct. 14, 1988, 63-259041
Int. Cl.[4] G02F *1/35*
U.S. Cl. 350—96.29 **4 Claims**

1. A fibre-type light wavelength conversion device for changing the wavelength of an incident beam and emerging it as a beam having a predetermined wavelength, comprising:

a core;
a cladding layer around said core; and



a transparent conical layer provided around said cladding layer, said conical layer having a diameter increasing at a predetermined inclination from an end of incidence toward an end of emergence.

4,874,222
HERMETIC COATINGS FOR NON-SILICA BASED OPTICAL FIBERS

Lubos J. B. Vacha; Peter C. Schultz, both of Sturbridge, Mass.; Cornelius T. Moynihan, Watervliet, N.Y.; Satyabrata Raychaudhuri, Sturbridge, Mass.; Ken C. Cadien, Pittsford, N.Y.; Barry B. Harbison, Alexandria, Va., and Reza Mossadegh, Silver Spring, Mass., assignors to SpecTran Corporation, Sturbridge, Mass.

Continuation-in-part of Ser. No. 846,331, Mar. 31, 1986, Pat. No. 4,735,856, which is a continuation-in-part of Ser. No. 74,646, Jul. 17, 1987. This application Feb. 25, 1988, Ser. No. 160,545
Int. Cl.[4] G02B *6/00;* B05D *5/06;* D02G *3/00*
U.S. Cl. 350—96.34 37 Claims

1. An optical fiber product having a non-silica based optical fiber and an encapsulating hermetic coating comprising at least one of carbon, an inorganic fluoride, a metalloid or a ceramic compound in a thickness sufficient to impart moisture resistance to said optical fiber product.

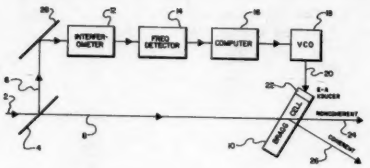
26. An optical fiber product comprising: a core of a fluoride glass comprising about 25–39 mole percent ZrF_4, about 13–27 mole percent HfF_4, about 10–24 mole percent BaF_2, about 1–6 mole percent LaF_3, about 2–5 mole percent AlF_3, about 9–25 mole percent NaF and 0 to 1 mole percent InF_3; a fluoride glass cladding adjacent said core; an oxide glass coating of an alkali-borophosphate or an alkali-group II metal-phosphate adjacent said cladding; and an encapsulating hermetic coating comprising at lest one of carbon, a metal, a metalloid, or a ceramic compound having a density of between about 3.2 and 6.3 g/cc, said hermetic coating having a coefficient of thermal expansion of between about 5.5° and $15°\times10^{-6}°C.^{-1}$ and being present in a thickness sufficient to impart moisture resistance to the optical fiber product.

4,874,223
OPTICAL NOTCH FILTER FOR DISCRIMINATING AGAINST COHERENT RADIATION

Thomas R. O'Meara, Malibu, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Continuation of Ser. No. 83,410, Aug. 10, 1987, abandoned. This application Feb. 17, 1989, Ser. No. 312,428
Int. Cl.[4] G02B *27/00;* G02F *1/33;* G01J *3/45*
U.S. Cl. 350—163 20 Claims

18. An optical filter system, comprising:
an optical filter,
means for receiving an input optical radiation beam and transmitting at least a portion of the beam to the filter,
means for detecting the presence of a predetermined characteristic of the beam,
means for generating a control signal for application to said filter in response to the detection of said predetermined characteristic, said control signal operating upon said

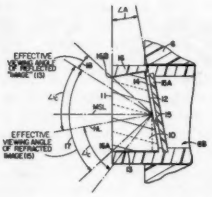


filter to modify said predetermined characteristic within the beam, and
means for applying the control signal to the filter.

4,874,224
VEHICULAR DISPLAY VIEW CONTROL SYSTEM

Robert F. Gutman, St. Clair Shores, and Robert Migrin, Dearborn, both of Mich., assignors to United Technologies Automotive, Inc., Dearborn, Mich.

Filed May 24, 1988, Ser. No. 198,025
Int. Cl.[4] G02B *27/14;* G01D *11/28;* B60Q *1/00;* G08B *5/36*
U.S. Cl. 350—174 32 Claims



1. An automotive informational display system using associated light of the visible spectrum to view informational indicia and having limited angles of viewing the informational indicia from in front of the display system, comprising:
a vehicle having at least one passenger seat having a seating surface upon which an occupant sits in while traveling in the vehicle;
a light transmitting optical element, located in said vehicle in a position viewable by an occupant sitting on said seating surface, having a transparent body having a first index of refraction and having at least three, spaced, operative faces, including
a front, light transmitting surface,
an internal refractive surface, and
a separate, internal, secondary surface spaced from said refractive surface;
an interfacing medium interfacing with said refractive surface and having a second, different index of refraction less than that of said first index of refraction; and
an informational indicia element, associated with said interfacing medium and said refractive surface of said optical element, having the informational indicia associated with it to be displayed to a first limited area above the seating surface of said passenger seat and located in front of said front, light transmitting surface of said optical element using light of the visible spectrum, and undisplayed at a second, limited area different than said first area but also located at a vertical level above the seating surface of said passenger seat and in front of said front, light transmitting surface of said optical element, said front, light transmitting surface being viewable from both said first and said second areas;
the geometry of said optical element itself and the relative

angles and separation distances of said spaced, light transmitting, reflective and secondary surfaces,

the relative indices of refraction of said optical element and said interfacing medium, and

the wavelength(s) of the light used in association with the informational display,

in combination causing light coming from said indicia element to be transmitted to said first area and preventing light from said indicia element from being transmitted to said second area, the informational indicia being viewable in said first area but unseen in said second area.

4,874,225

SOLAR GREENHOUSE ROOF

Anthony S. Pruszenski, Jr., Plum Island, Mass., assignor to Energy Innovations, Inc., Mineral Wells, Tex.

Filed Jul. 14, 1988, Ser. No. 219,605
Int. Cl.[4] G02B *17/00, 27/00*
U.S. Cl. 350—259 **13 Claims**

1. A solar greenhouse roof system comprising:

(a) a base;

(b) a plurality of relatively large light reflectors mounted atop said base;

(c) one or more relatively small focusing light reflectors located so as to receive reflected light from said large light reflectors; and

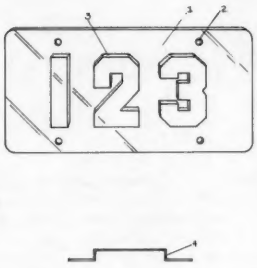
(d) one or more light transparent pipes mounted in holes in said base and functioning to receive reflected light from said one or more relatively small focusing light reflectors and to filter out certain frequencies of said reflected light, each light-transparent pipe consisting of a plate of light-transparent material arranged to receive light at one edge and to discharge light at another, opposite edge.

4,874,226

LICENSE PLATE LENSES

Kevin McDonald, 768 Georgia Ave., Akron, Ohio 44306

Filed Apr. 15, 1988, Ser. No. 182,117
Int. Cl.[4] G02B *27/00*
U.S. Cl. 350—319 **5 Claims**



1. A license plate lens, comprising:

(a) a rectangularly-shaped plastic lens having a plurality of orifices so as to coincide with a license plate holder of most, if not all, automobiles, and;

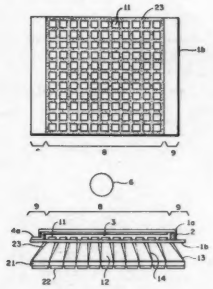
(b) a logo or other nomenclature vacuum-formed in said plastic lens so as to create a raised and enhanced surface in said lens.

4,874,227

LARGE-SIZED LIQUID CRYSTAL DISPLAY

Hideki Matsukawa; Takeshi Masuyama; Minoru Hirota; Yasuo Wakahata; Masahiro Itoh, and Shinji Harada, all of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 807,073, Nov. 27, 1985, abandoned. This application Feb. 9, 1988, Ser. No. 154,436
Claims priority, application Japan, Mar. 28, 1984, 59-61479
Int. Cl.[4] G02F *1/13*
U.S. Cl. 350—334 **26 Claims**



2. A large-sized liquid crystal display comprising:

(a) a large number of liquid crystal display devices on a single plane, each formed by arranging pixels in liquid crystal interposed between transparent substrates which allow light from a light source to pass through;

(b) a plurality of light guides each having at least one light guide element corresponding to each of said liquid crystal display devices for guiding light rays, each of said light guides being positioned to cover display portions of said respective liquid crystal display devices and also junctions between said liquid crystal display devices; and

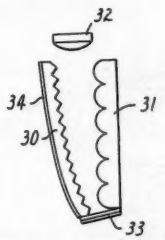
(c) a plurality of opaque masking members each provided at the front surface of each of said liquid crystal display devices such that said pixels in said liquid crystal display devices are respectively encircled thereby when viewed from the front of said liquid crystal display devices.

4,874,228

BACK-LIT DISPLAY

Kenneth A. Aho, Chisago City; Jeffrey J. Melby, St. Paul, and Richard A. Miller, Stillwater, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 30,033, Mar. 24, 1987, Pat. No. 4,799,137. This application Jan. 3, 1989, Ser. No. 292,762
Int. Cl.[4] G02F *1/133, 1/01*
U.S. Cl. 350—345 **18 Claims**



1. A back-lit display comprising:

a housing defining an optical cavity having an optical window;

a light reflecting film in said optical cavity, said light reflecting film having first and second major surfaces, said first surface being a structured surface having a plurality of

triangular prisms thereon and said second surface being a smooth surface, and a light reflecting means adjacent said second surface for reflecting light approaching said second surface from said first surface;

a first light source positioned so that light rays approach said film in a direction that is almost parallel to said second surface of said film; and

display means in said optical window.

4,874,229

PLANAR DIMMER

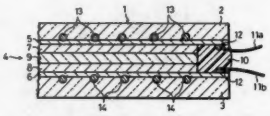
Toshiyasu Ito; Jun Minoura; Takaaki Mori; Shigeyuki Takahashi; Mamoru Kato; Junichi Shimada, and Fujio Hayakawa, all of Aichi, Japan, assignors to Toyoda Gosei Co., Ltd., Nishigasugai, Japan

Filed Mar. 25, 1988, Ser. No. 173,594

Claims priority, application Japan, Mar. 31, 1987, 62-49746[U]; Apr. 28, 1987, 62-64626[U]

Int. Cl.[4] G02F *1/17*

U.S. Cl. 350—357 **8 Claims**



1. A planar dimmer comprising

a transparent base,

a dimming means, capable of dimming, comprising a first electrode layer disposed on said base, a second electrode layer set facing said first electrode layer, and a coloring means, disposed between said first and second electrode layers, that colors and discolors in response to a stimulus from said electrodes, and

a conducting means disposed between said base and first electrode layer in such a way to be in contact with said first electrode layer to apply a uniform voltage throughout said first electrode layer, said conducting means comprising a plurality of long, fine conductors arranged throughout the surface of said first electrode layer.

4,874,230

ZOOM LENS WITH A VARIABLE POWER LENS ELEMENT

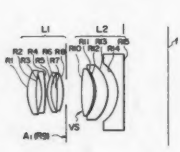
Shigeyuki Suda, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 15, 1987, Ser. No. 3,461

Claims priority, application Japan, Jan. 28, 1986, 61-016512

Int. Cl.[4] G02B *15/15, 9/64*

U.S. Cl. 350—423 **6 Claims**



1. A zoom lens which is provided with a forward unit having a positive power and a rearward unit including an element having a surface shape which is variable, and wherein from the wide angle end to the telephoto end, said forward unit and said rearward unit are both moved form the image surface side to the object side and at the same time, the radius of curvature of said variable surface is varied, and when the power of said rearward unit at the wide angle end is $\psi 2$ and the power of said rearward unit at the telephoto end is $\psi 2+\Delta 2, \Delta\psi 2$ is negative.

4,874,231

ZOOM LENS

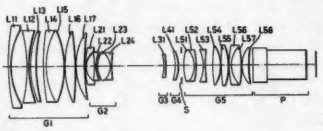
Yasuhiro Aono, Kawasaki, Japan, assignor to Nikon Corporation, Tokyo, Japan

Filed Oct. 21, 1988, Ser. No. 260,717

Claims priority, application Japan, Nov. 11, 1987, 62-284842

Int. Cl.[4] G02B *15/14*

U.S. Cl. 350—427 **9 Claims**



1. A zoom lens of five-unit construction including, in succession from the object side: a first lens unit having a positive refractive power and which is fixed during magnification change; a second lens unit of negative refractive power having the function as a variator effecting magnification change and which is movable linearly on the optic axis toward the image side during the magnification change from the wide angle end to the telephoto end; a third lens unit and a fourth lens unit, having the function as a compensator for correcting the fluctuation of the image surface caused by the magnification change of said second lens unit and for keeping the position of said image surface constant, movable on the optic axis with different locuses so as to describe a curve convex toward the object side in conformity with said movement of said second lens unit; a fifth lens unit having an imaging function and fixed with said first lens unit during magnification change; and a stop disposed more adjacent to the image side than said fourth lens unit.

4,874,232

IMAGING OPTICAL SYSTEM

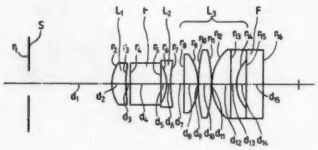
Akira Hasegawa, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Nov. 10, 1988, Ser. No. 269,453

Claims priority, application Japan, Nov. 13, 1987, 62-285454

Int. Cl.[4] G02B *15/14, 9/60*

U.S. Cl. 350—427 **4 Claims**



1. An imaging optical system comprising a first lens unit having positive refractive power and the function of a compensator, a second lens unit having negative refractive power and the function of a variator, a third lens unit having positive refractive power and the function of an imaging lens, and a stop arranged before the first lens unit, said imaging optical system being so designed as to satisfy the following conditions (1), (2) and (3):

(1) $1.4>\beta_1/\beta_{ST}>0.71$

(2) $f_W \leqq f_1 \leqq f_T$

(3) $2<f_W/f_3<3.2$

wherein the reference symbol f_1 represents focal length of the first lens unit, the reference symbol f_3 designates focal length of

the third lens unit, the reference symbol f_W denotes focal length of the optical system as a whole at the wide position thereof, the reference symbol f_T represents focal length of the optical system as a whole at the tele position thereof, the reference symbol β_1 designates magnification of the first lens unit, and the reference symbol β_{ST} denotes magnification of the optical system as a whole at an intermediate focal length thereof.

4,874,233

DIAPHRAGM CONTROL DEVICE FOR INTERCHANGEABLE LENS

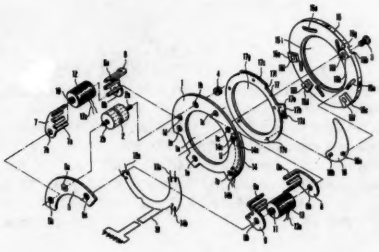
Hiroshi Yamomoto, Kanagawa; Shigeru Yoshida, and Katumi Yoshida, both of Saitama, all of Japan, assignors to Canon Kabushiki Kaisha and Canon Denshi Kabushiki Kaisha, both of Tokyo, Japan

Filed Apr. 7, 1987, Ser. No. 35,453

Claims priority, application Japan, Apr. 14, 1986, 61-055846[U]; Apr. 14, 1986, 61-085516; Jul. 16, 1986, 61-167494; Jul. 17, 1986, 61-168913; Jul. 17, 1986, 61-168914; Jul. 18, 1986, 61-169431

Int. Cl.[4] G02B *15/00, 7/14*

U.S. Cl. 350—429 **18 Claims**



12. A diaphragm device for an interchangeable lens, comprising:

(a) a cam plate having an optical path opening in a central portion thereof;

(b) a rotary plate having an optical path hole in a central portion thereof and being arranged to face said cam plate, said rotary plate having a toothed portion on a part of an outer peripheral surface thereof, said toothed portion being disposed inside of an outermost peripheral surface of said cam plate;

(c) a plurality of diaphragm blades rotatably mounted between said rotary plate and said cam plate and arranged to open or close said optical path opening and said optical path hole when said rotary plate rotates;

(d) a motor located outside of said optical path opening and said optical path hole; and

(e) a gear to be rotated by a rotating force of said motor and engageable with said toothed portion of said rotary plate so as to rotate said rotary plate by the rotating force of said motor.

4,874,234

TORIC CONTACT LENS WITH DISPLACED CENTER OF GRAVITY

Otto Wichterle, Prague, Czechoslovakia, assignor to Ceskoslovenska akademie ved, Czechoslovakia

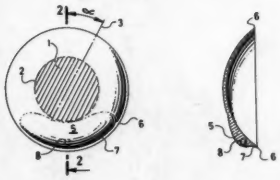
Filed Jun. 11, 1985, Ser. No. 743,519

Claims priority, application Czechoslovakia, Jun. 18, 1984, 4634-84

Int. Cl.[4] G02C *7/04*

U.S. Cl. 351—161 **5 Claims**

1. A toric contact lens with a center of gravity displaced in the direction towards its edge due to one-sided thickening, wherein an optical zone of the said lens has a center of gravity precisely in the lens axis, the thickening being along one edge of the lens to displace the center of gravity of the whole lens outside its axis, said thickening having the shape of a drop



which would be formed by the running down due to gravity of a liquid wetting the front convex suface of the lens after placing the lens in a vertical position.

4,874,235

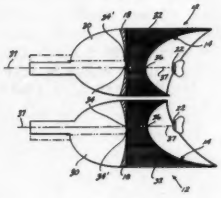
STEREOSCOPIC VIEWING SYSTEM AND METHOD

John A. Webster, 2077 Dike Rd., Mt. Vernon, Wash. 98273

Filed Nov. 17, 1987, Ser. No. 121,441

Int. Cl.[4] A61B *3/08;* G02C *1/00*

U.S. Cl. 351—201 **11 Claims**



1. Apparatus for the viewing of stereoscopic images by a viewer, the apparatus being used in conjunction with contact lenses that cause the viewer's eyes to be closely focused, comprising:

image display means including means for receiving signals representative of left and right images, left and right concave display surfaces, each surface having a display center, and means for displaying said left and right images on said display surfaces; and

mounting means for closely mounting said display surfaces at fixed positions relative to the viewer's head such that the viewer's centerlines of vision are aligned with said display centers, whereby the viewer's eyes are focused on said display surfaces.

4,874,236

OPHTHALMOLOGIC APPARATUS FOR FUNDUS EXAMINATION

Fabian Abraham, Bnei-Brak, Israel, assignor to Ramot University Authority for Applied Research and Industrial Development Ltd., Tel-Aviv, Israel

Filed Mar. 2, 1988, Ser. No. 163,049

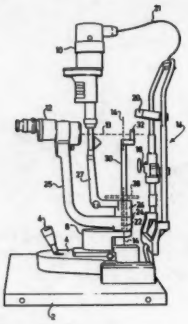
Claims priority, application Israel, Mar. 4, 1987, 81776

Int. Cl.[4] A61B *3/10*

U.S. Cl. 351—205 **14 Claims**

1. Ophtalmologic apparatus for fundus examination of a patient's eyes, comprising: a base, an illumination device carried by said base and rotatable about a vertical axis, a microscope carried by said base and rotatable about said vertical axis, a fixture for fixing the patient's head and eyes with respect to said vertical axis, a vertical rod carried by said base along said vertical axis, and a lens carried at the upper end of said

vertical rod in the optical axis of the microscope and the examined eye and displaced from said vertical axis towards said



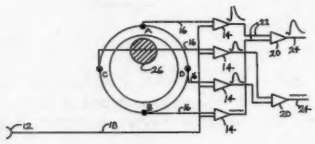
examined eye for a fixed distance, corresponding to the power of said lens, such as to image the retina of the examined eye at a location for reimaging it by the microscope.

4,874,237

ELECTRORETINOGRAM APPARATUS

Stephen J. Cringle, Hillarys, Australia, assignor to Lions Eye Inst. of Western Australia, Nedlands, Australia

Filed May 5, 1988, Ser. No. 190,755
Claims priority, application Australia, May 7, 1987, PI1790
Int. Cl.[4] A61B *3/10, 5/04*
U.S. Cl. 351—221 8 Claims



1. An electroretinogram apparatus for taking measurements of signals from a person's eye in response to stimulus which comprises a first reference electrode arranged to be electrically connected to a part of the person's body and a plurality of second scleral electrodes arranged to be distributed in spaced apart manner, about the sclera away from the cornea, means for simultaneously recording the amplitude of signals from the plurality of second scleral electrodes and means for recording differences between opposed pairs of electrodes of the plurality of second scleral electrodes thereby allowing the determination of the magnitude and location of a lesion that may be present in the eye.

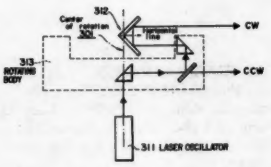
4,874,238

METHOD AND DEVICE FOR MEASUREMENT WITH LASER BEAM

Tatsuyuki Ochi; Nobuo Tanaka, and Kohei Mio, all of Yokohama, Japan, assignors to Kajima Corporation, Tokyo, Japan

Filed Jun. 25, 1987, Ser. No. 66,423
Claims priority, application Japan, Aug. 27, 1986, 61-199096; Dec. 3, 1986, 61-286783; Jan. 26, 1987, 62-13986
Int. Cl.[4] G01C *1/00;* G02B *26/08*
U.S. Cl. 356—1 6 Claims

2. A device for detecting an angle using a laser, comprising a laser device for rotatingly irradiating at least two laser beams in substantially parallel horizontal planes, said laser device being placed at a reference point, a measuring point sensor for detecting said laser beams, said sensor being placed at a measuring point which forms a first line between said reference point and said measuring point, a time measuring device for measuring time intervals between detections of said laser beams and an angle computing display device that calculates



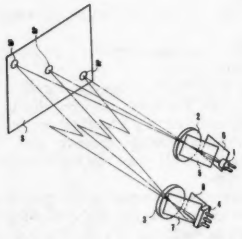
an angle between a symmetrical axis of said two laser beams and said first line and then displays said angle, wherein said laser device has at least one prism means for splitting a laser beam from a laser oscillator means and for projecting said two laser beams which rotate in opposite angular directions.

4,874,239

DISTANCE MEASURING DEVICE

Shuichi Tamura, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 31,158, Mar. 25, 1987, abandoned, which is a continuation of Ser. No. 636,590, Aug. 1, 1984, abandoned. This application Mar. 21, 1988, Ser. No. 171,151
Claims priority, application Japan, Aug. 10, 1983, 58-145068
Int. Cl.[4] G01C *3/08;* G03B *3/00*
U.S. Cl. 356—4 48 Claims



1. A transmitting/receiving device for projecting a plurality of signal light beams toward a plurality of places on an object and receiving the signal light beams reflected from the object, comprising:

light emitting means for emitting light;

reflection means for reflecting a portion of the light emitted from said light emitting means in a non-parallel direction with respect to the unreflected portion of said emitted light;

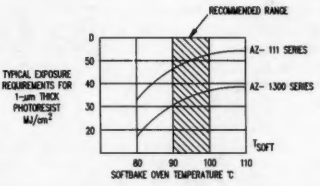
a projection member for forming said plurality of signal light beams by converging the unreflected portion of said emitted light toward a first place on the object, and by converging the reflected portion of the emitted light toward a second place on the object, the plurality of formed signal light beams emanating from a common portion of said projection member and being projected respectively to said first and second places; and

light receiving means for receiving the signal light beams reflected from said object.

4,874,240
CHARACTERIZATION OF SEMICONDUCTOR RESIST MATERIAL DURING PROCESSING

Michael P. C. Watts, Portola Valley; Thiloma I. Perera, Sunnyvale; David W. Myers; Robert G. Ozarski, both of Livermore; John F. Schipper, Palo Alto, and Raul V. Tan, San Jose, all of Calif., assignors to Hoechst Celanese, Sommerville, N.J.

Filed Mar. 1, 1988, Ser. No. 162,431
Int. Cl.[4] G01B *11/00*
U.S. Cl. 356—73 **10 Claims**



1. A method for evaluating the quality of a semiconductor resist material produced by a softbake process, that contains a solute and a solvent and that is deposited as a substantially planar film on a substrate, the method comprising the steps of:

determining the absorption $a=1-e^{-\alpha L_o}$ (L_o=single pass optical path length in the film of interest, if any) and absorption coefficient $(\alpha L)_o$ of the substrate surface before the coat process begins, through a measurement of Total Reflectivity of the substrate surface for a predetermined wavelength λ, predetermined incidence angle θ_1 and known index of refraction of the substrate;

depositing a resist film on the substrate at an estimated predetermined thickness;

determining the thickness of the resist film through a measurement of Total Reflectivity of the resist film at each of a sequence of one or more predetermined wavelengths λ_1, $\lambda_2, \ldots, \lambda_r$ at a sequence of one or more predetermined film incidence angles $\theta_{1,1}, \theta_{1,2}, \ldots, \theta_{1,s}$ (with $r+s \geqq 3$);

determining the absorption of $a=1-e^{-\alpha L}$ of the resist film after the coat process and before completion of the softbake process through a measurement of Total Reflectivity of the resist film for a predetermined wavelength λ, predetermined film incidence angle θ_1, and predetermined film thickness h;

forming the quantity $\Delta=\alpha L-(\alpha L)_o$ for each of the sequenmce of combinations of substrate and resist film deposited thereon;

comparing the value of Δ for each such combination with a predetermined target value Δ_t;

performing the softbake process for each such combination;

forming the quantity $\rho=h/\Delta$ for each of the sequence of combinations of substrate and resist film deposited thereon; and

comparing the value of ρ for each such combination with a predetermined target value ρ_t.

4,874,241
APPARATUS FOR THE INSPECTION OF TUBULAR TEXTILE PRODUCTS

Noël Egea, and Corinne Olive, both of Le Vigan, France, assignors to Societe Compagnie Generale Textile Cogetex, Le Vigan, France

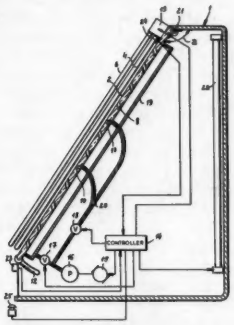
Filed Jul. 22, 1988, Ser. No. 223,431
Claims priority, application France, Jul. 23, 1987, 8710847
Int. Cl.[4] G01N *21/88*
U.S. Cl. 356—238 **9 Claims**

1. An apparatus for the inspection of tubular textile products, comprising:

an illuminated table;

a form for receiving a tubular textile product to be inspected and disposed along a front face of said illuminated table, said form comprising two pairs of mutually parallel arms extending generally upwardly and each receiving a tubular textile portion with each pair including a fixed arm and a transversely movable arm;

means for displacing said transversely movable arms upon the respective textile portions having been drawn over the respective pairs of arms, thereby spreading said portions



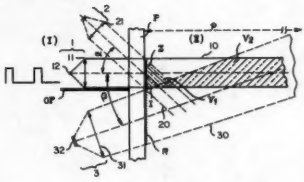
and enabling inspection thereof with light from said table, said table being traversed over the entire thickness thereof by oblique orifices oriented to direct respective jets of air forwardly toward said front face and upwardly at said tubular textile product to be inspected and to draw said portions upwardly over said arms; and

means along a rear surface of said table communicating with said orifices for delivering compressed air to said orifices.

4,874,242
DEVICE FOR DETECTION OF EXTRANEOUS SUBSTANCES THROUGH A WALL AND A SYSTEM FOR AIDING THE DRIVING OF AUTOMOBILES OR AIRPLANES

Jean-Jacques Bezard, Chaton; Philippe Feppon, Paris, and Pierre Rodionoff, Courbevoie, all of France, assignors to Jaeger, Levallois Perret, France

Filed Jul. 3, 1986, Ser. No. 881,900
Claims priority, application France, Jul. 4, 1985, 85 10277; Feb. 17, 1986, 86 02093
Int. Cl.[4] G01N *21/49*; G60Q *1/08*; G08B *21/00*
U.S. Cl. 356—341 **26 Claims**



1. A device for detecting the presence of extraneous substances in the vicinity of the surface of a separation wall between a first and a second medium, the wall having a first medium surface exposed to the first medium and a second medium surface exposed to the second medium, the substances being positioned in said first or second medium, said device comprising, on a first medium side of said wall:

means for illumination of said wall by emans of a source of electromagnetic radiation having a wavelength which corresponds to the transparency or semi-transparency of the constitutive material of said wall, said means permit-

ting illumination of the surfaces of said wall by an illumination beam in accordance with a reference illumination zone,

first directional detector means sensitive to said electromagnetic radiation and having a first reception cone that permits, in the region of said second medium surface of said wall, substantial covering of said referenc eillumination zone, said reception cone having, with respect to said illumination beam, an inclination such that a volume resulting from intersection of said illumination beam and said reception cone beyond said second medium surface of said wall is a minimum,

second directional detector means sensitive to said electromagnetic radiation, and having a second reception cone that permits in the region of said second medium surface the defining of a reception zone adjacent said refrence illumination zone, the second reception cone having, with respect to said illumination beam, an inclination such that a volume resulting from intersection of said illumination beam and said second reception cone beyond said second medium surface of said wall is a maximum, the illumination beam and the second rectpion cone having adjacent generatrices which intersect at a point of intersection situated in said second medium in the vicinity of said second medium surface of said wall, one of the extraneous substances being a solid, liquid or pasty substance deposited or precipitated on said second medium surface of said wall, particularly in said reference illumination zone, and a second extraneous substance detected being a vapor, aerosol, or solid particles in suspension in said second medium, said first and second detector means being electronically coupled in order that a first detected signal delivered by said first detector means constitutes a reference correction signal vis-a-vis a second detected signal delivered by said second detector means, said second detected signal being representative of retrodiffusion alone of said illumination beam by said second extraneous substance in suspension in said second medium.

4,874,243

APPARATUS FOR CONTINUOUSLY MEASURING THE TURBIDITY OF A FLUID

Benno Perren, Austrasse 33, 5430 Wettingen, Switzerland

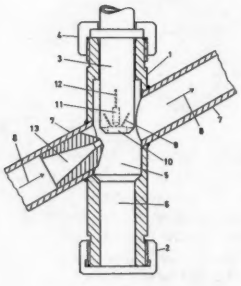
PCT No. PCT/CH87/00108, § 371 Date Apr. 25, 1988, § 102(e) Date Apr. 25, 1988, PCT Pub. No. WO88/01737, PCT Pub. Date Mar. 10, 1988

PCT Filed Aug. 26, 1987, Ser. No. 194,990

Claims priority, application Switzerland, Sep. 1, 1986, 3505/86

Int. Cl.[4] G01N *21/15, 21/53*

U.S. Cl. 356—342 **14 Claims**



1. An apparatus for continuously measuring turbidity of a fluid which contains particles causing turbidity, comprising:

a turbidity measuring device containing a measuring chamber and a measuring probe extending into said measuring chamber;

throughflow means for throughpassing at least a portion of the fluid to be investigated;

said throughflow means being connected to said turbidity measuring device for throughpassing said fluid to be investigated through said measuring chamber in a predetermined throughflow direction;

said measuring probe extending into said measuring chamber, containing an end face located in said measuring chamber and a single end window located at said end face and extending at a predetermined angle relative to said throughflow direction of said fluid to be investigated;

said throughflow means directing said fluid to be investigated to impinge at a predetermined angle upon said single end window located at said end face of said measuring probe, and at a fluid flow rate sufficient to prevent deposit formation on said single end window;

radiation guide means contained in said measuring probe for guiding and passing radiation through said single end window located at said end face of said measuring probe for irradiating said fluid to be investigated and throughpassing through said measuring chamber; and

an optical system contained in said measuring probe and cooperating with said single end window for receiving reflected radiation reflected by turbidity causing particles present in said fluid to be investigated and throughpassing through said measuring chamber.

4,874,244

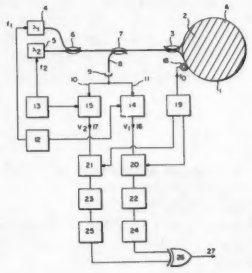
METHOD AND APPARATUS FOR INCREASING THE UNAMBIGUOUS SENSING RANGE IN AN INTERFEROMETRIC FIBER GYROSCOPE

Alan D. Kersey, Springfield, Va., assignor to Sachs/Freeman Associates, Inc., Landover, Md.

Filed Jun. 30, 1987, Ser. No. 68,181

Int. Cl.[4] G01B *9/02*

U.S. Cl. 356—350 **28 Claims**



1. A device for determining the operational fringe number of an interferometric optical fiber system comprising:

(a) means for providing first and second light signals having different wavelengths;

(b) means for combining said first and second signals into a combined input;

(c) means for introducing said combined input into an interferometric fiber system;

(d) means for detecting an output emanating from said interferometric system resulting from the introduction of said combined input into said system;

(e) means for dividing said output into a plurality of output signals, each representing a portion of said output attributable to one of said light signals; and

(f) means for determining the phase lag between said output signals, said phase lag being used to determine said operational fringe number.

4,874,245

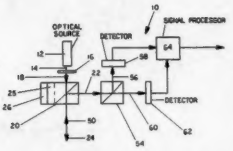
OPTICAL SHAFT ANGULAR AND TORSIONAL DISPLACEMENT AND SPEED SENSING SYSTEM

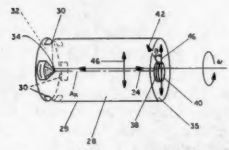
William B. Spillman, Jr., Charlotte; Robert E. Rudd, III, Middlebury; Sylvester M. Ellinger, North Ferrisburg; Douglas R. Patriquin, Middlebury, and Bruce R. Kline, Starksboro, all of Vt., assignors to Simmonds Precision Products, Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 162,794, Feb. 26, 1988. This application Jun. 3, 1988, Ser. No. 201,800

Int. Cl.[4] G01B *11/26*

U.S. Cl. 356—364 17 Claims





1. An apparatus for determining the displacement of a hollow rotatable shaft comprising:

polarization means disposed on a rotatably mounted hollow shaft for changing the polarization state of light energy; said polarization means comprising a retardation plate, said plate being disposed on an end of the shaft;

light producing means adapted to produce polarized light energy and direct the light energy toward said plate;

said detector means being adapted to detect the change in the polarization state of the light energy from said polarization means; and

means for determining the torsional displacement of said shaft from the detected change in polarization state of the light energy.

4,874,246

ARRANGEMENT FOR OPTICALLY MEASURING A DISTANCE BETWEEN A SURFACE AND A REFERENCE PLANE

Arie J. Den Boef, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

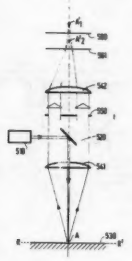
Continuation of Ser. No. 55,656, May 28, 1987, abandoned. This application Jan. 17, 1989, Ser. No. 298,200

Claims priority, application Netherlands, Jun. 4, 1986, 8601433

Int. Cl.[4] G01B *11/24*

U.S. Cl. 356—375 13 Claims

1. An apparatus for optically measuring the distance between a surface and a reference plane, comprising a radiation-source unit for illuminating an area on the surface with a narrow substantially parallel beam of radiation, a radiation-sensitive detection system for converting the radiation reflected from the surface into an electric signal, and an optical system having spherical aberration arranged between the surface and the detection system for concentrating radiation reflected from the surface on the detection system and said detection system being located at a position such that the radiation reflected from the surface is of a small cross section due to said spherical aberration, means for directing said radiation from said radiation-source unit along the optical axis of the optical system wherein a radiation-blocking plate is arranged in the radiation path between the surface and the detection system, which plate is formed with at least two radiation windows which are situated at a predetermined distance from one another and at a predetermined distance from the optical axis of the optical system, so as to select corresponding portions from the radiation beam originating from said surface in order to form on the



radiation-sensitive detection system radiation spots corresponding to the radiation windows in the radiation-blocking plate, the extent of the pattern of radiation spots thus formed being a measure of the distance between the surface and the reference plane.

4,874,247

MEASUREMENT POSITION SYNCHRONIZATION METHOD FOR A SCANNING DENSITOMETER

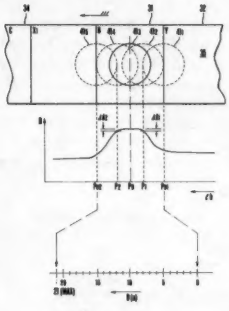
Hideo Watanabe, and Yoshiaki Kurata, both of Ibaraki, Japan, assignors to Komori Printing Machinery Co., Ltd., Tokyo, Japan

Filed Dec. 4, 1987, Ser. No. 128,693

Claims priority, application Japan, Dec. 8, 1986, 61-290505

Int. Cl.[4] G01J *3/50*

U.S. Cl. 356—402 9 Claims



1. A measurement position synchronization method applied to a scanning densitometer to photoelectrically scan a control strip comprising a plurality of color patches of respective colors printed on a paper to thereby calculate densities of said color patches in each color, said method comprising the steps of

(a) detecting measured values of scanning a color patch of a specified color;

(b) calculating points which have varied respectively by predetermined levels, on the side of a reference level included in said measured values,

(c) determining the intermediate point of said both points to calculate an actual measurement central point of said color patch of said specified color, and

(d) carrying out synchronization of measurement positions in accordance with the difference between, scheduled central point and said actual measurement central point.

4,874,248

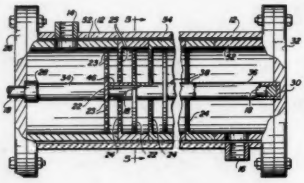
APPARATUS AND METHOD FOR MIXING A GEL AND LIQUID

Wayne E. Luetzelschwab, Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Filed Jul. 27, 1988, Ser. No. 225,104

Int. Cl.[4] B01F 7/02

U.S. Cl. 366—307 6 Claims



1. Apparatus for diffusing a liquid of relatively low viscosity into a gel of relatively high viscosity, comprising:

a chamber having an inlet through which a gel and a liquid are introduced into the chamber and an outlet downstream from the inlet through which the diluted gel and liquid are discharged;

a plurality of rotatable discs mounted for rotation in the chamber, the discs containing apertures through which the gel and liquid flow during passage from the inlet to the outlet;

means for rotating the rotatable discs to break the gel into relatively small particles;

the apertures being defined at least in part by edges which break the portions of gel passing through the apertures into smaller particles; and

stationary plates mounted between the rotatable discs, the stationary plates containing apertures through which the gel and liquid flow during passage between adjacent rotating discs;

the apertures in the rotatable discs and stationary plates being larger in discs and plates located nearer the inlet than in discs and plates located nearer the outlet;

whereby the gel is continuously subjected to forces tending to break the gel particles down to smaller size, thereby substantially increasing the amount of surface area of the gel exposed to the liquid to greatly accelerate the diffusion of the relatively low viscosity liquid into the gel.

4,874,249

ARRANGEMENT FOR CONTINUOUS MIXING OF LIQUIDS

Jan Kabátek, and Pavel Ditl, both of Praha, Czechoslovakia, assignors to Ceské vysoké ucení Technické, rektorát, Praha, Czechoslovakia

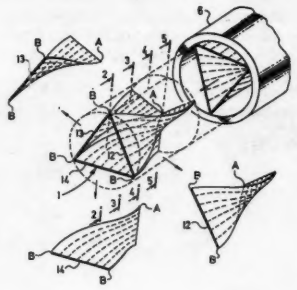
Filed Oct. 7, 1988, Ser. No. 254,622

Claims priority, application Czechoslovakia, Oct. 7, 1987, 7210-87

Int. Cl.[4] B01F 5/06

U.S. Cl. 366—339 3 Claims

1. An arrangement for continuous mixing of fluid media, said arrangement comprising a plurality of inserts with helical surfaces, arranged in a row in a conduit, each said insert comprising a plurality of helical insert members forming a polygon at the inlet of the insert, and extending along the conduit so as to create gaps between individual members, the helical insert members of each insert being mutually connected together at the inlet of the conduit and within a distance of 0.5 to one times the length of the insert, the width of each helical insert member being variable along the length thereof, whereby the overall throughflow area of the gaps between the helical insert members is about 0.2 to 3 times the area of the polygon formed at the inlet of the insert.



4,874,250

APPARATUS FOR EXAMINATION OF HEATS OF TRANSFORMATION OF MATERIAL SAMPLES

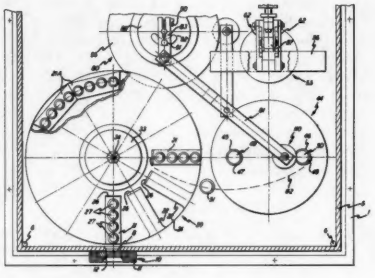
Winfried Gönner, Überlingen, Fed. Rep. of Germany, assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Continuation of Ser. No. 604,780, Apr. 27, 1984, abandoned. This application Dec. 4, 1986, Ser. No. 942,934

Claims priority, application Fed. Rep. of Germany, May 28, 1983, 3319410

Int. Cl.[4] G01N 25/20, 25/00

U.S. Cl. 374—43 13 Claims



1. Apparatus for examination of heats of transformation of material samples, comprising:

a test sample receiver (45) for one of a plurality of individually encapsulated test samples;

a reference sample receiver (46) for a reference sample;

a program-controlled cooling or heating device for the controlled cooling or heating of said test and reference samples;

a measuring device responsive to differences in the heating-up characteristic of said test and reference samples;

a test sample store for receiving said plurality of individually encapsulated test samples, said test sample store including a turntable adapted to receive elongate sample carriers radially disposed thereon and adapted to contain a plurality of radially-juxtaposed test sample encapsulations;

a program-controlled transfer mechanism by which one of said plurality of test samples can be transferred from said test sample store into, and removed from, said test sample receiver, said transfer mechanism including

a lever transmission from which one point in a plane of motion describes a coupler curve passing by said test sample store and said test sample receiver,

a driving motor for driving said lever transmission, and

a lifting mechanism movable in a direction normal to said plane of motion for engaging the encapsulation of each said test sample and arranged in said one point of said lever transmission said lever transmission being

a four-membered lever transmission so dimensioned with respect to its structure-fixed points and the lengths of its members that the coupler curve described by said lifting mechanism extends substantially rectilinearly and radially to said turntable, said lever transmission including

a first lever connected to a rotatable shaft of said driving motor and extending radially thereto,

a second lever pivoted in a pivotal point on said first lever and carrying said lifting mechanism, and

a third lever pivoted at one end of a structure-fixed point and at another end on said second lever between said pivotal point and said lifting mechanism, and

a program control device for controlling said cooling or heating device and said transfer mechanism whereby during one measurement cycle a test sample is first transferred from said test sample store into said test sample receiver by said transfer mechanism, said cooling or heating device effects the cooling or heating of said test and reference samples to carry out said measurement, and thereafter said test sample is removed from said test sample receiver by said transfer mechanism after said measurement.

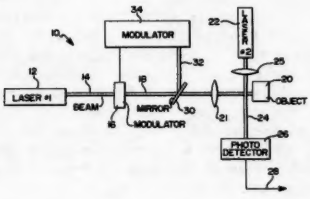
4,874,251
THERMAL WAVE IMAGING APPARATUS

Robert L. Thomas, Huntington Wood; Pao-Kuang Kuo, Troy, and Lawrence D. Favro, Huntington Wood, all of Mich., assignors to Wayne State University, Detroit, Mich.

Continuation of Ser. No. 596,515, Apr. 4, 1984, Pat. No. 4,589,783. This application Feb. 10, 1986, Ser. No. 808,350

Int. Cl.[4] G01N *21/00, 25/00*

U.S. Cl. 374—45 **4 Claims**



1. An imaging apparatus utilizing A.C. electrical signals generated by a thermal wave scan apparatus and indicative of the configuration of the surface and subsurface of a solid object to produce an on-line, real-time image useful in detecting the presence of surface and subsurface irregularities therein, in which a first heating energy beam is directed through the object to generate a temperature gradient, said imaging apparatus comprising:

means for converting the A.C. electrical signals generated by the thermal wave scan apparatus to digital signals;

memory means for storing the digital signals;

central processing means for controlling the transfer of the digital signals to the memory means;

means for displaying an on-line, real-time image of the surface and subsurface of the object; and

means for generating control signals for controlling X and Y axis point deflection of the displaying means for addressing the memory means to output therefrom signals to control the intensity of each displayed point on the displaying means.

4,874,252
ELECTRONIC THERMOMETER

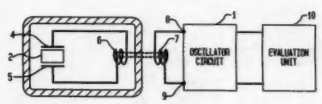
Horst Ziegler, Paderborn, and Horst Behlen, Paderborn-Dahl, both of Fed. Rep. of Germany, assignors to W. C. Heraeus GmbH, Hanau, Fed. Rep. of Germany

Filed Oct. 25, 1988, Ser. No. 262,512

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1987, 3744196

Int. Cl.[4] G01K *11/26, 7/32*

U.S. Cl. 374—117 **12 Claims**



1. An electronic thermometer having

a generally cylindrical rotatable sealed housing (3) of electrically insulating material; an oscillator comprising

a temperature-sensitive piezoelectric element (2) with a mechanical resonance frequency which is temperature-dependent, located inside said housing (3), said element including a pair of terminals (4,5);

an oscillator circuit (1), having a pair of oscillator input terminals (8, 9) galvanically separated from said rotatable housing and piezoelectric element, and an output;

evaluation unit means (10) for detecting temperature, connected to said oscillator output;

a first coil (6) located adjacent an outer wall of said rotatable housing (3) and connected across said piezoelectric element terminals (4, 5), and

a second coil (7) separated from said rotatable housing (3), but aligned with said first coil (6), and connected across said oscillator input terminals (8,9),

said coils (6, 7) transmitting a temperature-dependent signal from said piezoelectric element (2) to said oscillator circuit (1), thus directly specifying the oscillation frequency thereof, while providing said galvanic separation therebetween.

4,874,253
RADIATION DETECTOR WITH TEMPERATURE DISPLAY

Francesco Pompei, Wayland, and Michael W. Burke, Natick, both of Mass., assignors to Exergen Corporation, Natick, Mass.

Filed Mar. 27, 1987, Ser. No. 32,067

Int. Cl.[4] G01J *5/26*

U.S. Cl. 374—121 **34 Claims**

10. A radiation detector comprising:

a radiation sensor providing a radiation signal indicative of sensed radiation;

an autozero circuit which establishes a reference signal which is summed by summing means with the radiation signal from the radiation sensor to provide a display signal;

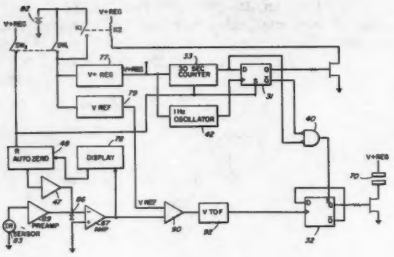
a display assembly responsive to the display signal and having a multicolor display for providing a visual indication of the amount of radiation sensed by the radiation sensor, the display arranged in segments of different colors;

a sound generator means for generating an audible signal with differing pulse frequencies, each pulse frequency corresponding to an amount of radiation indicated by the display such that the pulse frequency increases for increasing amounts of radiation indicated on the display

means for filtering out short wavelengths on the order of less than about 1.5 microns while allowing longer wave-

lengths above about 1.5 microns generated by sources of interest to be sensed by the sensor; and

a timing circuit means initialized when power is applied to the detector and which maintains power supply to circuits of the detector for a predetermined length of time through control of an internal power switch means and thereafter



automatically shuts off the detector by applying a control signal to the internal power switch means and a signal to actuate the sound generator means prior to shut-off of the detector said reference signal being reset when the detector is turned on subsequent to its automatically shutting off.

4,874,254

COOLANT OUTLET ELEMENT FOR USE IN COOLING SYSTEM OF INTERNAL COMBUSTION ENGINE

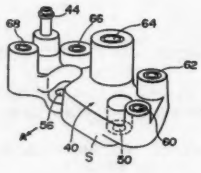
Tsuneo Miyamaru, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Sep. 15, 1988, Ser. No. 244,683

Claims priority, application Japan, Sep. 30, 1987, 62-149940[U]

Int. Cl.[4] G01K *1/00*

U.S. Cl. 374—208 **4 Claims**



1. A coolant outlet element for use in an internal combustion engine for mounting a plurality of temperature sensing elements for detecting the temperature of coolant in the engine, comprising a shell body formed with a coolant inlet port adapted to be directly connected with a coolant extraction port of the engine, a coolant outlet port adapted to be connected with a coolant pump equipped in the engine, a coolant passage defined in said shell body to extend between said coolant inlet port and said coolant outlet port, at least one inner deflector wall portion for deflecting said coolant passage in turn in a U-shape in said shell body, and a plurality of temperature sensing element fitting apertures positioned in series along said coolant passage as spaced apart from one another so as to receive the temperature sensing elements in a manner that temperature sensing portions of said temperature sensing elements are exposed to a flow of coolant passing along said coolant passage.

4,874,255

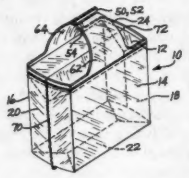
TOP GUSSET BAG WITH INTEGRAL HANDLE

James R. Ball, Kent, and Delbert J. Barnard, Federal Way, both of Wash., assignors to Cello Bag Company, Inc., Seattle, Wash.

Filed Dec. 2, 1988, Ser. No. 278,785

Int. Cl.[4] B65D *33/10*

U.S. Cl. 383—8 **15 Claims**



1. A handle bag, comprising:

first and second panels of flexible thermoplastic material overlying one another and together presenting an upper boundary and a lower boundary;

a web of thermoplastic material folded on itself, to form two web sections joined by a bight, and two edges near each other opposite the bight, said folded web being positioned between the two panels, with the bight of the folded web directed towards the lower boundary of the panels and the edges of the folded web spaced from the upper boundary of the panels a distance at least as large as the folded width of the web;

a heat seal on each side of the bag connecting an edge portion of each web section to an adjoining portion of the adjacent panel, to connect the web edge portions to the panels along lines which extend parallel to the bight and edges of the web and also parallel to the upper and lower boundaries of the panels;

heat seals sealing the panels and folded web together along spaced apart lines which extend parallel to each other and perpendicular to the bight and edges of the folded web and also perpendicular to the upper and lower boundaries of the panels, to form bag side seals which connect together the two sections of the folded web and the adjoining portions of the two panels, in the region where the folded web is between the two panels, and which also connect the two panels together in the regions of the panels which extend between the bight of the folded web and the lower boundary of the panels;

said panels being connected to each other and to the folded web by the heat seals in a manner so that the bag when filled can approximate the shape of a hexahedron with the web unfolded to form a closed top for the bag;

said panels being connected together at the upper boundary of the panels; and

wherein the portions of the panels that are located between the upper boundary of the panels and the heat seals which connect the web to the panels form a handle which extends over the closed top of the bag from one side of the bag to the other.

4,874,256

BAG WITH CARRYING HANDLE FOR CONTAINING MERCHANDISE

Patrick A. Baines, Charlotte, N.C., assignor to Venture Packaging, Inc., Charlotte, N.C.

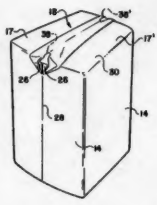
Filed May 24, 1988, Ser. No. 198,102

Int. Cl.[4] B65D *33/06*

U.S. Cl. 383—21 **11 Claims**

1. A bag for receiving and containing merchandise and the like, said bag comprising a sheet of flaccid material folded along a fold line to provide two juxtaposed wall panels having adjacent side edges joined to one another, said fold line being

tucked inwardly between said juxtaposed wall panels forming top edges along said wall panels and provides overlapping portions of said wall panels thereby forming a gusset consisting of said overlapping portions of said wall panels, a separate strip of material folded along a fold line extending along the length thereof to provide side portions on opposite sides of said fold line, said strip being disposed about said wall panels externally of said gusset with said fold line of said strip extending generally parallel to and adjacent to said top edges of said wall panels with said side portions of said strip extending across portions of said wall panels respectively, seal means joining the side portions of said strip of material at each end thereof to said



respective portions of said wall panels at seals formed in a V-shaped pattern defined by lines extending diagonally between said side edges and said top edges of said wall panels, and said strip having a slit therein at each end thereof along said fold line whereby the filling of said bag with merchandise will result in said wall panels assuming an open disposition having an end panel formed by said gusset, said slit having a predetermined length to permit said side portions of said strip to separate at said ends thereof and to permit said wall panels to assume said open disposition when said bag is filled, with said strip extending across said end panel and adjacent thereto to provide a handle for lifting and carrying said bag with the weight of said merchandise being borne at said seals.

4,874,257

METHOD OF FORMING A CLOSED FILLED BAG, A BAG CONSTRUCTION AND AN APPARATUS FOR FORMING THE BAG

Hiromichi Inagaki, Aichi, Japan, assignor to Nihon Tokkyo Kanri Company Limited, Tokyo, Japan

Filed Jan. 25, 1988, Ser. No. 148,352

Claims priority, application Japan, Jan. 27, 1987, 62-17738; Jan. 28, 1987, 62-11027[U]; Jan. 29, 1987, 62-12404[U]; Mar. 17, 1987, 62-63305

Int. Cl.[4] B65D *33/16*

U.S. Cl. 383—63 **5 Claims**

1. A bag construction, comprising a plastic seamless sheet having an U-shaped portion with sealing edges and a first and second pair of opposed ends which are sealable to cooperate with the U-shaped portion to define a bag body, a tap strip having opposed brim portions each having a zipper strip portion with a projection on one and a receiving socket on the other which are interengageable and hold said brim portions to form a tape strip U-shaped portion, said brim portions having marginal edges on sides of the respective zipper strip portions remote from said tape strip U-shaped portion, said marginal edges being sealed to said sealing edges of said bag body with said sheet U-shaped portion facing said tape strip U-shaped portion in opposed relationship.

4,874,258

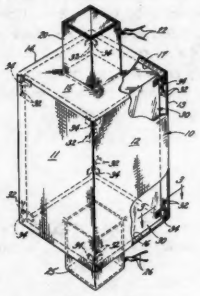
BULK CARGO CONTAINER WITH INNER LINER

Frank J. Marino, Opa Locka, Fla., assignor to Marino Technologies, Inc., Opa Locka, Fla.

Filed Jun. 23, 1988, Ser. No. 210,326

Int. Cl.[4] B65D *30/08*

U.S. Cl. 383—111 **4 Claims**



1. In a bulk cargo container comprising an outer bag member formed of flexible material and including upstanding and interconnected side walls, top and bottom wall means associated with the respective upper and lower ends of said side walls, and seam means extending around at least portions of the upper and lower ends of said side walls and serving to join said top and bottom wall means thereto, and an impervious inner liner of flexible material positioned within said outer bag member and including an outer surface generally conforming to the inner surface of said outer bag member, the combination therewith of means for releasably fastening said liner in said outer bag member, and wherein said releasable fastening means includes first mechanical fastening means fixed to the inner surface of said outer bag member and in spaced-apart locations adjacent the upper and lower ends of the side walls thereof, and second mechanical fastening means fixed to the outer surface of said liner and positioned adjacent said first fastening means, said first and second fastening means being contained entirely within the area between the inner surface of said outer bag member and the outer surface of said liner and being connectable together to maintain said liner in conforming condition relative to said outer bag member during both loading of material into said cargo container and unloading of material from said cargo container, and said first and second fastening means being separable to permit removal of said liner from said outer bag member.

4,874,259

BEARING DEVICE ASSEMBLY

Isao Sato, Sagamihara; Nobuhiko Miyake, Yokohama, and Souji Nishida, Fujisawa, all of Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 14, 1988, Ser. No. 144,319

Claims priority, application Japan, Jan. 19, 1987, 62-5763[U]

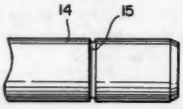
Int. Cl.[4] F16C *43/04*

U.S. Cl. 384—445 **11 Claims**

1. In a bearing device assembly including a shaft member supported by a rolling bearing at an intermediate position thereof, and a rotary member mounting seat press fitted to one

axial end of said shaft member, said shaft member having a rust resisting oil attached thereto, the improvement comprising:

a ring-shaped recess formed in at least one of a peripheral surface of the one axial end of said shaft member at one end thereof and an inner surface of said rotary member mounting seat, shoulder means formed on said recess for



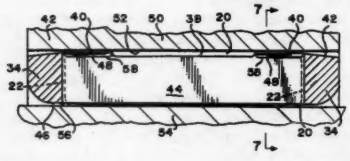
scraping off the oil attached to said one axial end of said shaft member by relative movement between the shoulder means of said recess and an end face of one of said shaft member and said rotary member mounting seat, and for directing any remaining oil on the fitting surface into said recess after said shaft member has been fitted into said rotary member mounting seat.

4,874,260

CAGE OUTER DIAMETER PROFILE

Stephen T. Podhajecki, Norfolk, Conn., assignor to The Torrington Company, Torrington, Conn.

Filed Mar. 21, 1988, Ser. No. 171,046
Int. Cl.[4] F16C *33/48*
U.S. Cl. 384—470 **3 Claims**



1. A cage-and-roller assembly comprising an annular cage and multiple rollers concentric with and radially inward of an outer raceway and lubricated with a fluid lubricant, wherein said cage comprises:

two annular end rims having outer surfaces;

multiple cross-bars, each of said cross-bars having a midsection outer surface, two land surfaces, two side surfaces and two ends, each of said ends being joined to one of said end rims, and said cross-bar land surfaces extending radially outwardly a greater distance than said midsection outer surface and said end rim outer surfaces so as to allow said cross-bar land surfaces to ride on said outer raceway;

multiple pockets defined by said end rims and said cross-bars, and sized to accommodate one of said rollers in each of said pockets; and

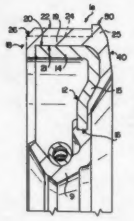
multiple ramp surfaces formed axially on each side of each of said cross-bar land surfaces, each of said ramp surfaces being formed at the juncture of said cross-bar land surface and one of said two cross-bar side surfaces, said ramp surface forming a tangential angle with said cross-bar land surface, and said ramp surface extending circumferentially from said cross-bar land surface into the adjacent pocket so as to limit outward radial motion of said rollers, said tangential angle of said ramp surfaces resulting in a hydrodynamic wedge effect to increase the pressure of said fluid lubricant between said cross-bar land surfaces and said outer raceway.

4,874,261

SEAL FOR BEARINGS

Franco Colanzi, and Angelo Vignotto, both of Turin, Italy, assignors to Riv-SKF Officine di Villar Perosa S.p.A., Turin, Italy

Filed Nov. 28, 1988, Ser. No. 276,800
Claims priority, application Italy, Dec. 23, 1987, 68117 A/87
Int. Cl.[4] F16C *33/78*
U.S. Cl. 384—484 **10 Claims**



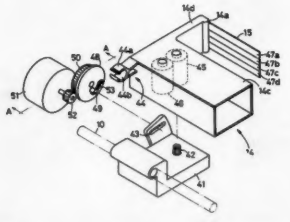
1. Sealing shield assembly for a rolling bearing having at least one ring with a seat comprising at least one essentially reinforcing member and an anchoring device made of an elastomeric material for securing said reinforcing member in the bearing seat, said reinforcing member including a peripheral annular sleeve portion shaped like a cylindrical sleeve, and said anchoring device including a radially elastically compressible sleeve section made of an elastomeric material and secured as a unit to the said reinforcing sleeve portion on a lateral coupling surface thereof, adapted to be interposed between the said annular sleeve portion and the bearing seat, a plurality of axial grooves on a separate lateral surface opposite the said coupling surface of said reinforcing annular sleeve portion, said grooves extending from a continuous annular end portion of the said elastomeric sleeve section to a point corresponding to a terminal rim of the said sleeve section interrupted by the said grooves, said elastomeric sleeve section being capable of interacting radially with interference with the bearing seat.

4,874,262

PRINTER HAVING PIVOTABLE RIBBON GUIDE

Takeshi Yokoi, Kakamigahara, and Shigeo Nakamura, Kasugai, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Apr. 13, 1988, Ser. No. 271,811
Claims priority, application Japan, Apr. 15, 1987, 62-94078
Int. Cl.[4] B41J *35/16*
U.S. Cl. 400—216.1 **24 Claims**



1. A printer comprising:

a generally enlongate platen supported at opposite ends thereof by a frame;

a first guide shaft and a second guide shaft which are supported at opposite ends thereof by said frame, so as to

extend parallel to said platen, said second guide shaft being spaced by a greater distance away from said platen than said first guide shaft;

a carriage slidably supported by said first and second guide shafts, for movements along said platen;

a print head mounted on said carriage so as to face said platen;

a ribbon cassette including a ribbon, and a ribbon container which accommodates said print ribbon such that an active length of said ribbon is exposed outside said container;

a ribbon guide supported by said second guide shaft pivotally about a central longitudinal axis of second guide shaft, for supporting said active length of said ribbon so as to pass between said platen and said print head;

ribbon-guide drive means for pivoting said ribbon guide about said second guide shaft and thereby moving said active length of the print ribbon relative to said print head and said platen, in a direction perpendicular to a longitudinal direction of said platen.

4,874,263

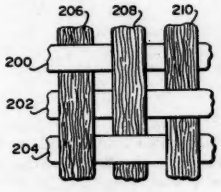
TWO BY ONE TWILL WEAVE FOR AN IMPRESSION FABRIC

Jones McCall, 105 ½ Sunset Dr.; Tom McClure, 102-D Yester Oaks, West, and Letcher Monroe, 2904 Stratford Dr., all of Greensboro, N.C. 27405

Continuation of Ser. No. 869,708, Jun. 2, 1986, abandoned. This application Dec. 15, 1988, Ser. No. 285,364

Int. Cl.[4] B41J *31/02*

U.S. Cl. 400—241.3 **24 Claims**



1. An impression printing tape constructed of fabric comprising a plurality of synthetic yarns interlaced with one another in a two by one twill weave, and wherein ink applied to the fabric is stored within interstices formed between the interlaced synthetic yarns.

4,874,264

SELECTIVE MAGNETIC ATTACHMENT OF A PRINT HEAD TO A DRIVE BELT

Takami Suzuki; Yoshikuni Tatara, both of Yokohama, and Tomoyuki Moriya, Hiratsuka, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 935,300, Nov. 26, 1986, abandoned, which is a continuation of Ser. No. 609,500, May 11, 1984, abandoned. This application Aug. 19, 1987, Ser. No. 86,956

Claims priority, application Japan, May 12, 1983, 58-83254; Aug. 20, 1983, 58-150957; Aug. 25, 1983, 58-154035; Aug. 31, 1983, 58-157788; Sep. 9, 1983, 58-165029

Int. Cl.[4] B41J *19/56*

U.S. Cl. 400—335 **7 Claims**

1. A printer for printing graphic information as well as character information selectively, comprising:

a housing;

a platen roller rotatably supported in said housing;

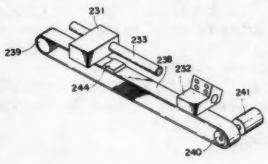
first driving means for driving said platen roller to rotate it;

a plurality of printing means supported to be movable independently from one another along said platen roller in a reciprocating manner;

second driving means for driving at least one of said printing means to move it along said platen roller;

coupling means for selectively coupling at least one of said printing means to said second driving means; and

control means connected to said first and second driving means, said plurality of printing means and said coupling means for controlling the operation of said printer, wherein



said second driving means includes a transmitting member disposed along said platen roller and a driving motor for driving said transmitting master in either direction, and said coupling means includes at least one magnetic element fixedly attached to said transmitting member and a plurality of electromagnet units each fixedly provided in a corresponding one of said printing means, one of said plurality of electromagnet units being selectively energized by said control means to be coupled to said magnetic element.

4,874,265

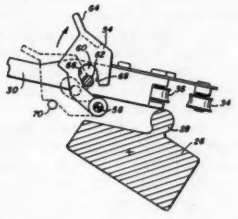
IMPACT MECHANISM FOR IMPACT PRINTER

Helmut K. Waibel, Fremont, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Jun. 14, 1988, Ser. No. 206,555

Int. Cl.[4] B41J *9/04*

U.S. Cl. 400—357 **2 Claims**



1. An impact mechanism is an impact printer, for delivering a printing force to drive a character element against a platen by means of a print tip normally spaced from the surface of said platen by a throat distance and movable toward and away from said platen, said character element and said print tip being supported upon a carriage mounted upon said printer for reciprocating movement in a path substantially parallel to the axis of said platen, including

a rockable bail bar having an axis of rotation substantially parallel to the axis of said platen, and constrained to limited angular movement toward and away from said platen,

a prime mover connected to bail bar for imparting the rocking movement thereto,

a push rod for interconnecting said print tip and said bail bar so as to close said throat distance for delivering an impact force to said platen as said bail bar is moved toward said platen, and

decoupling means supported upon said carriage and associated with said push rod for decoupling it from and recou-

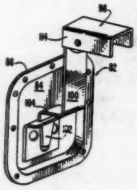
pling it to said bail bar, said decoupling means comprising a pivotable lever including a handle portion and a camming surface, and said push rod including a cam follower cooperable with said camming surface.

4,874,266

METHOD AND APPARATUS FOR FORMING A DESK

Marvin W. Thompson, Pasadena; Timothy C. Jennings, Arcadia; James A. Scott, Anaheim, all of Calif.; Ronald W. Phenicie, Warrenton, Va.; Margaret H. Murphy, La Verne, Calif.; Gabriel D. Nakash, Phillips Ranch, Calif.; James R. Biggers, Ontario, Calif.; Lynnlee M. Boudreau, Monrovia, Calif., and Jorge H. Curiel Contreras, Baldwin Park, Calif., assignors to Anvil Cases, Inc., Rosemead, Calif.

Division of Ser. No. 57,124, Jun. 2, 1987, Pat. No. 4,819,567.
This application Jul. 26, 1988, Ser. No. 224,415
Int. Cl.[4] F16B *12/02*
U.S. Cl. 403—407.1 **5 Claims**



1. Fastener means for fastening a top portion of a storage member to a bottom portion of a storage member comprising:

(a) first and second fastener members;

(b) said first fastener member including a support member fixed to the top portion of said storage member, and a tongue having a base portion rotatably fixed to said support member and being movable between an open and in closed position; and

(c) clamping means for holding said tongue in a closed position;

(d) said second fastener member fixed to said bottom portion of said storage member, and having a first and second opposed walls in spaced relationship and third and fourth opposing walls in spaced relationship, said walls connected by a bottom surface to define a recess, a bracket, said bracket including a lateral portion extending outwardly from said bottom surface with a slot therethrough for receiving said tongue; and

(e) said bracket, said tongue and said recess configured to permit fastening of said first fastener member with said second fastener member with said top portion and said bottom portion in abutting relationship.

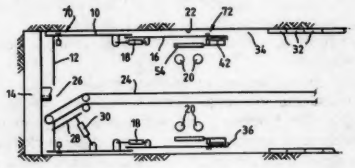
4,874,267

TUNNEL BORING MACHINE

Gordon R. Ince, Essex, England, assignor to James Howden & Company Limited, Glasgow, Scotland

Filed Dec. 15, 1987, Ser. No. 133,344
Claims priority, application United Kingdom, Dec. 18, 1986, 8630310
Int. Cl.[4] E21D *9/06*
U.S. Cl. 405—142 **11 Claims**

1. A tunnel boring machine comprising a front, substantially cylindrical shield, a cutting head mounted at the forward end of said front shield, a rear substantially cylindrical shield mounted co-axially with respect to said front shield and telescopically arranged thereto and having a rearmost edge, radially extensible grippers mounted on said rear shield forwardly of said rearmost edge and movable radially outwardly to grip the wall of the tunnel cut by said cutting head, hydraulic rams to move said front shield axially with respect to said rear shield, at least one shutter mounted on said rear shield, means mounting said at least one shutter for movement axially of said machine between a forward, retracted position and a rearward extended position, in which latter position said at least one



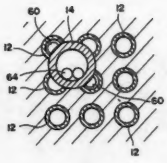
shutter extends rearwardly of the rear-most edge of the rear shield, and an auxiliary hydraulic ram associated with said at least one shutter to move it between said positions.

4,874,268

METHOD AND APPARATUS FOR BUILDING PIPELINE AND SHIELD TUNNELLING MACHINE

Toshio Akesaka, Yokohama, Japan, assignor to Kabushiki Kaisha Iseki Kaihatsu Koki, Tokyo, Japan

Filed Oct. 19, 1988, Ser. No. 259,927
Claims priority, application Japan, Nov. 18, 1987, 62-289565
Int. Cl.[4] E02D *29/10*
U.S. Cl. 405—184 **4 Claims**



3. A shield tunnelling machine used for building a new pipeline while breaking a plurality of existing pipelines extending parallel to each other, comprising:

a shield body;

a cutter assembly disposed in front of said body so as to be rotatable about an axis parallel to an axis of said body; and

a pair of stabilizers disposed on said body so as to project respectively from an opposed outer peripheral portion of said body;

wherein said cutter assembly is dimensioned for breaking said existing pipelines so as to form a plurality of opposed remaining portions while said machine is advanced, and wherein each of said stabilizers is disposed and dimensioned so as to slideably engage with one of said remaining portions while said machine is advanced.

4,874,269

SEMI SUBMERSIBLE DEVICE AND METHOD OF TRANSPORTING A MARINE SUPERSTRUCTURE AND PLACING IT ONTO OR REMOVING IT FROM A MARINE STRUCTURE

Edward D. Dysarz, 11423 Triola La., Houston, Tex. 77072

Continuation-in-part of Ser. No. 887,536, Jul. 21, 1986, Pat. No. 4,829,924. This application May 2, 1988, Ser. No. 189,386
Int. Cl.[4] E02B *17/00*; B63B *35/44*
U.S. Cl. 405—209 **16 Claims**

1. A method of transporting a semi submersible vessel and a marine superstructure on a second vessel that is floating in a body of water, to an erection site and further removing said semi submersible vessel from said second vessel and further removing said marine superstructure from said second vessel and further placing said marine superstructure onto said semi

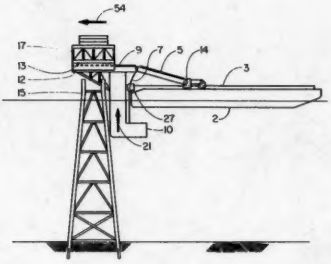
submersible vessel, said semi submersible vessel having at least one fixed and rigid beam cantilevered from only one side of said semi submersible vessel and further placing said one side of said semi submersible vessel with said cantilever beam near only one side of a marine superstructure and further placing said marine superstructure onto a marine structure comprising the steps of:

A. removing said semi submersible vessel from said second vessel;

B. ballasting said semi submersible vessel, causing said semi submersible vessel to turn into an upright vertical position;

C. removing said marine superstructure from said second vessel and placing said marine superstructure onto said semi submersible vessel;

D. elevating said semi submersible vessel with said marine super structure to a position higher than said marine structure;



E. placing said fixed and rigid cantilevered beam over said marine structure;

F. placing said marine superstructure onto said fixed and rigid cantilever beam;

G. placing said marine superstructure on said fixed and rigid cantilever beam, over said marine structure;

H. lowering said semi submersible vessel and thereby lowering said marine superstructure supported on said fixed and rigid cantilever beam onto said marine structure;

I. further lowering said semi submersible vessel, relative to said marine structure and further lowering said fixed and rigid cantilever beam until said marine superstructure is supported on said marine structure and is no longer supported on said fixed and rigid cantilever beam and said fixed and rigid cantilever beam is disengaged from said marine superstructure;

J. further withdrawing said fixed and rigid cantilever beam from below said marine superstructure.

4,874,270

METHOD AND APPARATUS FOR REDUCING IMPEDANCE OR CORE MATERIAL IN SONIC PILE DRIVING

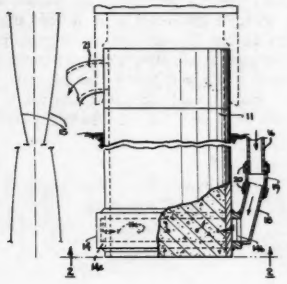
Albert G. Bodine, 7877 Woodley Ave., Van Nuys, Calif. 91406

Filed Apr. 1, 1985, Ser. No. 718,702
Int. Cl.[4] E02D *15/00*
U.S. Cl. 405—248 **5 Claims**

1. In a pile driving apparatus, for sonically driving a tubular pile member having an open bottom end into an earthen formation, the improvement being means for lowering the impedance presented to the sonic driving action by earthen core material lodged in the open bottom end comprising:

a cylindrical shoe member attached to the bottom of the pile member in concentricity therewith, said shoe member forming a concentric channel around the pile member;

said pile member having apertures formed around the bottom end thereof, said apertures providing fluid communication between said concentric channel and the earthen core material, and



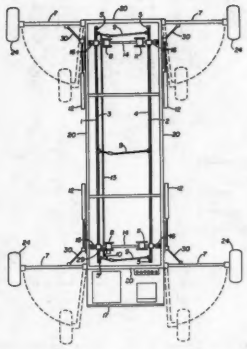
means for feeding foam material to the said shoe member, said foam material being mixed with the core material so as to lower the impedance thereof to the sonic driving.

4,874,271

SELF-PROPELLED TRENCH SHORING MACHINE

Jimmie D. Arnold, P.O. Box 301, Monte Vista, Colo. 81144

Filed Dec. 22, 1986, Ser. No. 944,995
Int. Cl.[4] E02D *17/00*
U.S. Cl. 405—283 **7 Claims**



1. A trench shoring machine, comprising:

a main frame having first and second spaced apart longitudinally extending side walls, and first and second spaced apart, transversely extending opposite end walls joining said side walls;

first and second pairs of substantially vertical guide members carried by said main frame with one member of each pair being near an opposite transverse side wall of the main frame and each pair of guide members being near an opposite one of the end walls of the main frame;

first and second transversely extending carrier bars respectively engaging said first and second pairs of vertical guide members for guided vertical travel with respect to the main frame;

a first plurality of shoring plates including a top plate and a lower plate;

a pair of carrier brackets connected to said top plate and each supported from a different one of said carrier bars for movement along the length of the carrier bars with the top plate, transversely of the main frame, and for substantially

vertical movement with the top plate and carrier bars with respect to the vertical guide members;

an elongated member joined to said lower plate for selectively moving the lower plate between relatively upper and lower vertical positions with respect to the main frame, wherein the lower plate in said upper position supports the top plate in a relatively upper position, and the lower plate in said lower position permits the top plate to move to a relatively lower position; and

means for moving said elongated member to selectively move the lower plate between the upper and lower positions.

4,874,272

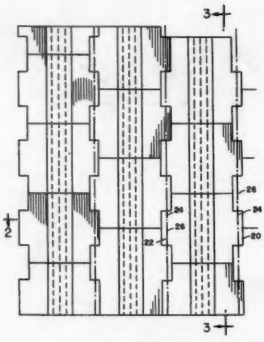
CANTILEVER RETAINING WALL SYSTEM USING DISCRETE PRECAST FACING PANELS

Philip D. Egan, Great Falls, Va., assignor to The Reinforced Earth Comany, Arlington, Va.

Filed Nov. 9, 1987, Ser. No. 117,845

Int. Cl.[4] E02D *29/00*

U.S. Cl. 405—284 **4 Claims**



1. An improved cantilever type, retaining wall for retention of fill, said wall comprising, in combination:

a plurality of preformed wall panels forming in combination a vertical, generally planar retaining structure for supporting the fill behind said wall panels; said panels defining a repeating mosaic pattern and each panel including a facing portion and in integral, cantilever beam, an enclosed preform projecting from a back side of each panel, said panels arranged in the mosaic with the preforms of vertically adjacent panels aligned to define a preform mold passage extending the height of vertically adjacent panels;

a plurality of vertical beam members aligned at the backside of the wall panels, said members each defining a generally vertical cantilever beam that is cast in place and formed by the preforms;

means for mechanically connecting each of the cast in place beam between adjacent preforms comprising reinforcing members retained within the preform and extending vertically between adjacent preforms prior to forming the cast in place beam; and wall panel fill against the backside of the panels.

4,874,273

APPARATUS FOR HOLDING AND/OR CONVEYING ARTICLES BY FLUID

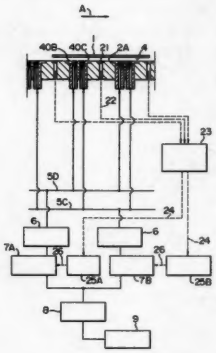
Hiromitsu Tokisue, Nihari; Nobuo Tsumaki, Ushiku, and Toshifumi Koike, Nihari, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

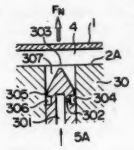
Filed Feb. 16, 1988, Ser. No. 155,808

Claims priority, application Japan, Mar. 16, 1987, 62-58836; Mar. 16, 1987, 62-58837

Int. Cl.[4] B65G *51/03, 47/24, 51/16*

U.S. Cl. 406—88 **10 Claims**



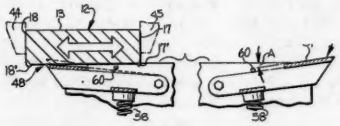


4. In a conveyor apparatus in which a fluid film is formed between a delivery surface of a delivery path and an article to be conveyed, and said article is conveyed in a non-contact condition relative to said delivery surface by said fluid film, the improvement comprising: fluid injection means provided in said delivery surface for supplying fluid at a low flow rate to form said fluid film between said delivery surface and article, said fluid injection means being formed in said delivery surface; a pressurized fluid supply source connected to said fluid injection means for supplying pressurized fluid to said fluid injection means; flow rate adjusting means disclosed between said pressurized fluid supply source and said fluid injection means for adjusting a flow rate; detecting means for detecting a position of said article to be conveyed; and controlling means for controlling said flow rate adjusting means in accordance with signal supplied from said detecting means; said fluid injecting means includes a pressurized fluid supplying portion, a resistance portion for applying a resistance to pressurized fluid from said pressurized fluid supplying portion, a suppression portion for suppressing a flow velocity of the fluid from said resistance portion, and an opening portion for allowing the fluid from said suppressing portion to flow toward the article with its resistance being smaller than a resistance of said resistance portion.

4,874,274
APPARATUS FOR REMOVING DROSS RIDGES FROM THE SIDES AND ENDS OF A METAL WORKPIECE

Matthew A. Mancuso, New Kensington, Pa., assignor to Keibler-Thompson Corporation, Kensington, Pa.

Continuation of Ser. No. 141,055, Jan. 5, 1988, abandoned. This application Nov. 4, 1988, Ser. No. 267,715
Int. Cl.[4] B23D *1/00*
U.S. Cl. 409—300 17 Claims



1. An apparatus for removing a dross ridge along a side edge of a metal workpiece of the type resulting from a torch cutting operation or the like, and comprising

workpiece support means having opposite ends and opposite side edges, and defining a longitudinal direction between said ends, and a transverse direction between said side edges,

workpiece transport means for moving a metal workpiece supported on said support means in opposite transverse directions,

cutting blade means extending along at least one side edge of said support means, with said at least one cutting blade means comprising a plurality of separate blades which are aligned along the associated side edge of said support means, and wherein each of said blades includes an outer generally flat surface and a longitudinally extending side, and with the junction of the outer surface and the side defining a longitudinally extending cutting edge,

means mounting each of said blades for separate pivotal movement about a longitudinal axis which is spaced from said cutting edge, and with the cutting edges thereof facing outwardly from said support means, and

means for separately biasing each of said blades about its associated longitudinal pivotal axis in a direction toward the adjacent surface of a workpiece supported on said support means, and so that each cutting edge may be held in contact with the adjacent surface of a workpiece moving transversely across said support means, and such that said at least one cutting blade means is adapted to engage and remove a dross ridge formed on the adjacent workpiece surface when the workpiece is moved in a transverse direction across said support means with the dross ridge disposed substantially parallel to the longitudinal direction and opposing said cutting edge.

4,874,275
SECURE THREE-PIECE THREADED FASTENER, AND METHOD

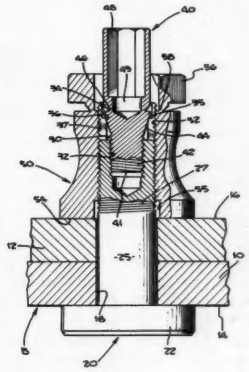
Alexander S. Gotman, Los Angeles, Calif., assignor to Gene W. Arant; Marvin H. Kleinberg and Marshall A. Lerner, all of Los Angeles, Calif.

Filed Jun. 22, 1987, Ser. No. 64,466
Int. Cl.[4] F16B *31/00, 39/02*
U.S. Cl. 411—5 10 Claims

1. A three-piece fastener including a bolt with a shank having a concentric opening in its threaded end, a nut adapted to fit over the threaded end of the bolt, and a wedge member which is insertable into the end opening of the bolt for expanding and thereby securing it;

the threaded end of the bolt being axially slotted to facilitate its expansion, and the outer diameter of the wedge member being smaller than the outer diameter of the threaded end of the bolt, so that when the bolt is to be inserted into an opening of a structure in order to accomplish a fastening action, the wedge member may first be loosely inserted into the end opening of the bolt, the bolt and wedge may be passed through the opening, the nut may be applied to the end of the bolt and tightened, and the wedge may thereafter be tightened in order to expand the end of the bolt;

the end opening of the bolt having interior threads which are threadedly engaged by the wedge member but in an opposite rotational sense to that in which the nut is applied to the bolt; and

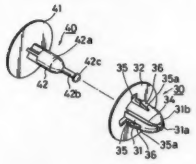


the wedge member having a driving portion on its outer end, and a weakened circumferential wall which fractures and shears off when a predetermined torque is applied for tightening the wedge member, the location of the weakened wall being such that after the shearing action takes place the remaining part of the wedge member is substantially contained within the end of the bolt.

4,874,276
FASTENER

Tatsuya Iguchi, Toyota, Japan, assignor to Nifco, Inc., Yokohama, Japan

Filed Sep. 7, 1988, Ser. No. 241,432
Claims priority, application Japan, Sep. 14, 1987, 61-140483[U]
Int. Cl.[4] F16B *13/04*
U.S. Cl. 411—48 13 Claims



8. A fastener system as set forth in claim 7, wherein:

said insertion member has a flange portion provided at one end thereof for engaging and seating upon said flanged portion of said substantially cylindrical outer member when said insertion member is disposed within said axial bore of said substantially cylindrical outer member so as to radially expand said second opposite end of said substantially cylindrical body portion of said substantially cylindrical outer member.

4,874,277

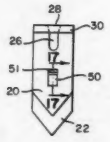
WALL FASTENER AND METHOD OF FABRICATION

Thomas E. Nowak, Elk Grove Village; Edward J. Smith, Arlington Heights, both of Ill., and Eustathios Vassiliou, 12 S. Townview La., Newark, Del. 19711, assignors to Eustathios Vassiliou, Newark, Del.

Continuation-in-part of Ser. No. 1,756, Jan. 9, 1987, Pat. No. 4,765,788. This application Aug. 14, 1987, Ser. No. 85,154

Int. Cl.[4] F16B *13/04*

U.S. Cl. 411—61 3 Claims



1. A quenched, thin, sheet metal anchor for a fastening member for a hollow wall, the fastening member comprising in addition to the anchor a fastener for insertion in the anchor, the anchor comprising a substantially flat head portion and a hold therethrough, said hole having an axis perpendicular to the head, a substantially flat neck in a plane perpendicular to the head containing the axis, the neck having an opening therethrough, the opening extending in the plane of the neck the full length of the neck along the axis and, first and second, thin flat sheet metal spreadable anchoring blades extending from said neck in the direction of the axis, the blades being coplanar with the neck, each of the blades having an inner and an outer surface, the inner surface of the first blade being adjacent the inner surface of the second blade, at least one of said blades terminating in a point, the first blade, having a bent portion extending obliquely from the first blade toward the second blade, the bent portion comprising an end and two lateral sides and forming a first part of a complementary engaging means, the second part of the complementary engaging means being on the second blade, the bent portion extending at least partially into the engaging means in the second blade, at least one of the two lateral sides of the bent portion frictionally engaging at least a part of the engaging means in the second blade.

4,874,278

WOOD SCREW WITH CHIP REMOVING PORTION

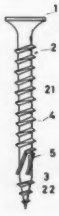
Fukunosuke Kawashita, Kawachinagano, Japan, assignor to Kabushiki Kaisha Yamahiro, Osaka, Japan

Filed Aug. 31, 1987, Ser. No. 90,917

Claims priority, application Japan, Feb. 16, 1987, 62-20901

Int. Cl.[4] F16B *25/02*

U.S. Cl. 411—386 4 Claims



1. A wood screw comprising:

a head for receiving a fastening tool;

a shank extending from said head, said shank having a fastening screw portion extending over a first portion thereof, said fastening screw portion having at least one screw thread;

a chips removing screw portion adjacent said fastening screw portion, said chips removing screw portion extending over a second portion of said shank, said shank in said first and second portions having generally the same diameter, said chips removing portion having more screw threads than said first portion of the shank, one of said screw threads of said chips removing screw portion being in engagement with said at least one screw thread of said first portion of the shank, another one of said screw threads of said chips removing screw portion being free of said at least one screw thread, the screw threads of said chips removing screw portion having a larger lead angle than the at least one screw thread of said first portion of the shank; and

a tip portion adjacent said chips removing screw portion such that said chips removing screw portion is between said first portion of the shank and said tip portion, said tip portion having at least one screw thread form thereon and being adapted to penetrate an article, said screw thread of the tip portion adjacent the chips removing screw portion having an outer diameter which is generally the same as an outer diameter of the at least one screw thread of the first portion of the shank, said at least one screw thread of said first portion of the shank being located on a helical extension line of said screw thread of said tip portion;

said chips removing screw portion conveying and spreading chips formed by said article toward said first portion of the shank upon penetration of said article by said tip portion and upon formation of a hole in said article.

4,874,279

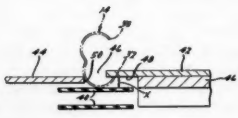
SEMI-AUTOMATIC BINDER

Ernst Pfaffle, Neuffen, Fed. Rep. of Germany, assignor to Sickinger Company, Auburn Hills, Mich.

Filed Apr. 15, 1988, Ser. No. 182,108

Int. Cl.[4] B42B *5/10*

U.S. Cl. 412—39 13 Claims



1. A semi-automatic binding apparatus for loosely binding together a plurality of sheets by means of an elongated continuous formed wire member having a plurality of generally C-shaped spaced loops receivable within openings provided along an edge portion of said sheets, said apparatus comprising:

means for supporting said elongated continuous wire member in such a manner as to enable said sheets to be assembled thereto, said supporting means including first and second spaced elongated members defining a channel therebetween, one end of each of said C-shaped loops being supported by the undersurface of one of said first and second elongated members, the other end of each of said C-shaped loops projecting through said channel and above the upper surface of said one elongated member whereby said sheets may be assembled thereto; and

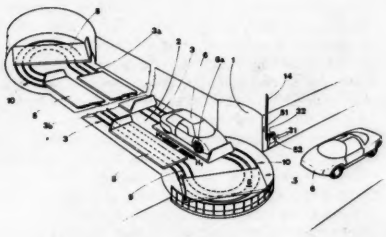
closing means longitudinally spaced from said supporting means for receiving said wire members with said sheets assembled thereto and exerting a pressure thereon operative to close said loops to thereby secure said sheets in assembled relationship.

4,874,280

SELF-SERVICE, COMPUTER-OPERATED, MECHANICAL-ELECTRONIC EQUIPMENT FOR PARKING VEHICLES CLOSELY IN SIDE BY SIDE ROWS

Enzo Gamberini, Zola Predosa, Italy, assignor to V.B. Di Gamberini Enzo, Bologna, Italy

Filed Jul. 21, 1986, Ser. No. 887,812
Int. Cl.[4] E04H *6/34*
U.S. Cl. 414—234 **3 Claims**



1. A self service, computer operated, mechanical-electronic equipment for parking vehicles closely in side by side rows, comprising: at least one guide fixed to a base and positioned above said base, said guide constituted by at least two endless rails each configured to define a longitudinal intermediate section and two circular end sections, and a track profiled similarly to the profile of said rails and positioned between said rails; at least one pair of movable elements of support, equidistant one with respect to the other, carried by said rails in a way to undergo sliding motion controlled by said track; at least one platform on which to receive an identical number of vehicles; each platform resting on a pair of said movable elements of support; means for driving, synchronously said movable elements of support with it being possible for each platform to transit at a station for loading and unloading at least one vehicle onto and from the said platform, said pair of movable elements of support constituted by at least two independent bars, namely a front bar and a rear bar, the center part of each bar being pivotally connected to a corresponding platform, said bars being able to rotate with respect to said platform by vertical pins positioned between said platform and said center part of each bar, said vertical pins being connected to said drive means by said vertical pins contacting said drive means; and means for orienting and guiding said bars and designed to maintain each of said bars substantially perpendicular to the instantaneous relative motion direction, said means for orienting and guiding the bars comprising for each bar, two rollers, the first of which is sustained by the aforesaid vertical pin connected to said drive means, whereas the second is sustained by a further vertical pin rigidly fitted to the said center part of the corresponding bar through an arm, both said rollers sliding in alignment between two opposite inner surfaces of said track to cause the rotation of the related said bar irrespective of the curving radius of said track and rails.

4,874,281

METHOD OF MAKING UP BATCHES OF SMALL ITEMS, AND AN INSTALLATION IMPLEMENTING THE METHOD

Jean-Marcel Bergerioux, Chateauneuf sur Isere; Claude Pavie, Houilles, and Christian Plent, Bourg les Valence, all of France, assignors to Societe Anonyme dite: Compagnie Generale D'Automatisme CGA-HBS, Paris, France

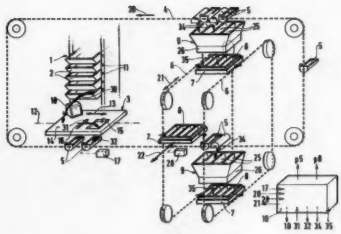
Filed Mar. 27, 1987, Ser. No. 30,648
Claims priority, application France, Mar. 27, 1986, 86 04449
Int. Cl.[4] B65G *37/00*
U.S. Cl. 414—285 **16 Claims**

1. An installation for making up batches of small items in individual packs in response to a set of orders specifying the different varieties of items required in each batch together with corresponding quantities thereof, said installation comprising a storage bay storing a plurality of possible varieties of items, variety by variety,

a first endless delivery conveyor holding a plurality of buckets for delivering individual items, the delivery conveyor running substantially around said installation, with a clear space between opposite runs extending substantially along the installation;

a station for injecting individual items onto said buckets, mounted facing both said storage bay and said delivery conveyor;

at least one second endless sorting conveyor holding packs for sorting into batches the injected items, mounted orthogonally to the delivery conveyor, with a clean space between opposed runs and with orthogonal paths therebetween passing close to each other and defining transfer



zones for transferring the items from the buckets to the packs;

first drive means for driving said delivery conveyor;

individual second drive means for each, sorting conveyor;

first means for holding said buckets horizontal on said delivery conveyor, except in the transfer zones,

second retractable means for holding said buckets horizontal and third retractable means for tipping said buckets in the transfer zones, and means coupling said second and third retractable means in a reciprocating configuration through a control member whereby, whenever on of them is retracted the other is engaged, and

a central control unit coupled to said injection station to determine the position of each injected item onto said delivery conveyor, and to said individual second drive means to cause coincidences between the injected items and the packs in the transfer zones and to control said control member corresponding to each coincidence to effect transferring of items from the buckets to the packs.

4,874,282

PALLET STOCKER APPARATUS FOR PRINTER

Teruo Orikasa, Tokyo; Sigeo Sumi, Saitama, and Hiroshi Taguchi, Tokyo, all of Japan, assignors to Somar Corporation, Tokyo, Japan

Filed Oct. 29, 1987, Ser. No. 113,968
Claims priority, application Japan, Jan. 17, 1986, 61-7593
Int. Cl.[4] B65B *69/00*
U.S. Cl. 414—416 **8 Claims**

1. A pallet stocker system, comprising:

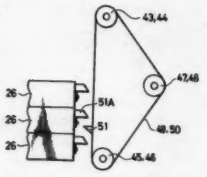
a pallet stocker for storing a plurality of pallets piled in a stack, said pallets being used to store sheets and having first pawl members; and

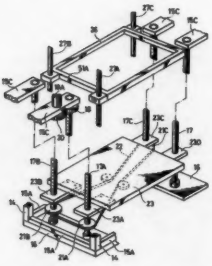
means for transferring said sheets from selected ones of said pallets in said pallet stocker and to selected ones of said pallets in said pallet stocker, said transferring of said sheets to and from said pallet being performed with a vertical motion of said transferred sheets separating from or coming into contact with said pallets;

said pallet stocker comprising

a pallet support mechanism for supporting in said stack said plurality of pallets, and

a pallet carrier mechanism for vertically moving a selected one of any of said plurality of pallets, thereby moving all





of said pallets above said selected pallet in said stack, said pallet carrier mechanism including a chain having a second pawl member selectively engagable with one of said first pawl members and further comprising driving means for driving said chain in opposite vertical directions.

4,874,283

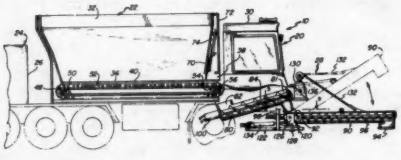
FRONT DISPENSING TRUCK WITH VERTICALLY AND HORIZONTALLY SWINGABLE SCREW CONVEYOR

Irvin H. Hurley, Jr., Wallingford, Conn., assignor to Tilcon Tomasso, New Britain, Conn.

Filed Feb. 29, 1988, Ser. No. 162,091

Int. Cl.[4] B60P *1/40*

U.S. Cl. 414—504 **20 Claims**



1. A front discharge material transporting and dispensing truck, comprising:

a truck comprising a frame having a forward portion and a rear portion, and a middle portion therebetween;

an engine mounted on the rear portion of the truck;

a cab located in the forward portion of said truck;

a container for the material to be transported and dispensed located in the middle portion of said truck, said container having an opening at its forward end;

means for conveying material located in the bottom of said container and extending from the rear to the forward end of said container for moving material forwardly to said container opening;

a first trough extending forwardly underneath said cab from the forward end of said container, the rearward end of said first trough having an opening adjacent said container opening for receiving material from said container;

a first screw auger disposed within said first trough for transporting said material beneath said cab and through said first trough;

a second trough extending forwardly from a point adjacent the forward end of said first trough, said second trough having an opening at its rearward end for receiving material from the forward end of said first trough, and having an opening at its forward end for dispensing said material;

a second screw auger disposed within said second trough for transporting said material through said second trough;

a platform rigidly connected to the frame of the forward end of said truck underneath said cab;

a mounting plate adapted to receive and partially surround the rearward end of said second trough, said mounting plate being mounted on said platform;

a pivot mounting securing said second trough to said surrounding portions of said mounting plate;

a pivot mounting securing said mounting plate to said platform said two pivot mountings permitting said second trough a range of horizontal and vertical movement such that said dispensing opening may be located at a selected point adjacent the ground within the range of spacial movement provided by said pivot mountings;

said second trough being vertically swingable relative to said surrounding portions;

said rearward end of said second trough lying underneath said truck;

means for transmitting power from said engine to said conveying means to operate said conveying means;

means for transmitting power from said engine to said first and second screw augers to operate said first and second screw augers;

means for synchronizing said first screw auger and second screw auger such that the operation of said second screw auger begins before the operation of said first screw auger;

hydraulically activated means for moving said dispensing opening in the forward end of said second trough operably connected to said second trough and providing a sufficient force within a substantial portion of the range of movement of said trough to direct and locate said dispensing opening at a selected point adjacent the ground to deliver material thereto;

means for vertically swinging the end portions of said second trough.

4,874,284

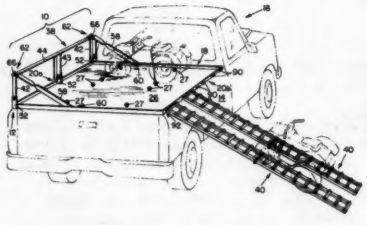
KIT FOR TRANSPORTING ALL TERRAIN VEHICLES

James Truitt New, Jr., P.O. Box 1421, Wimberley, Tex. 78676

Filed Dec. 3, 1987, Ser. No. 128,072

Int. Cl.[4] B65G *67/02*

U.S. Cl. 414—537 **1 Claim**



1. A kit for adapting a pickup truck for safely loading, trans-

porting, and unloading two all terrain vehicles on a platform over said truck's bed area while preserving cargo space in said bed area comprising:

a platform frame, rectangular in shape and having dimensions approximately equal to dimensions of said truck bed, said platform frame being made from angle iron and having first and second short sides each with first and second short side ends and first and second long sides each with first and second long side ends, said short sides and said long sides being joined together at right angles whereby a vertical long side lip of each said long side which lies perpendicular to the plane defined by said frame joins with a like-oriented vertical short side lip of each said short side and a horizontal long side lip of each said long side which is oriented parallel with said plane joins with a like-oriented horizontal short side lip of each said short side, said horizontal long side lip of said first and second long sides having holes sized for allowing bolts to pass therethrough to engage said platform frame with side walls of said bed, said platform frame to be attached to said side walls whereby said vertical long side lips and said vertical short side lips extend away from said bed;

a platform floor having dimensions for residing within a boundary defined by said vertical long side lips and said vertical short side lips while being supported by said horizontal long side lips and said horizontal short side lips;

first and second hinge brackets made from metal strips each having first and second hinge bracket ends, said first ends of said first and second hinge brackets being respectively attached to said vertical short side lip of a first said short side and to said vertical short side lip of a second said short side adjacent to said first and said second short sides' connection with said first long side, said first and second hinge brackets each having a hole near said second hinge bracket end for allowing a bolt to pass therethrough;

a safety barrier to prevent said vehicles from being accidentally driven off of said platform during loading, said safety barrier being constructed of angle iron, said barrier comprising first and second side pieces approximately eighteen inches in length, each having first and second side piece ends, said barrier further comprising a cross piece having first and second cross piece ends and being approximately ½ inch shorter in length that said long sides, said first and second side pieces and said cross piece being connected to form three sides of a rectangle with said first and second side pieces' first side piece ends being respectively connected with said first and second cross piece ends, said second side piece ends each having a second hole passing therethrough for allowing a bolt to pass through each said side piece and thereafter to pass through said first hole of said hinge bracket to hingedly couple said safety barrier with said frame in a manner to allow said safety barrier be lowered and raised;

first and second threaded studs attached to said cross piece adjacent respectively to said first ends of said first and second side pieces and extending outward from said cross piece parallel with said side pieces;

first and second safety barrier braces each having first and second brace ends, said safety barrier braces being made from strips of metal, said first brace ends of said first and second safety barrier braces being respectively attached to said first and second short sides on their said vertical short side lips at positions and in orientations whereby said second brace ends respectively reach said first and second threaded studs when said safety barrier is in a raised position, said safety barrier braces each having a third hole near their said second safety barrier ends sized for allowing said threaded studs to pass therethrough to couple said safety barrier with said braces;

first and second ramps for loading said vehicles, said ramps each having first and second ramp connecting cylinders attached at an end of each said ramp on either side of said ramp, said ramps comprising two spans hingedly connected whereby said ramps may be changed between an extended usable configuration and a collapsed transportation/storage configuration;

first, second, third, and fourth pairs of frame connector cylinders mounted on said vertical long side lips of said first and said second long sides, said frame connector cylinders of each said pair being relatively positioned whereby said ramp connector cylinders of either of said ramps may juxtapose said frame connector cylinders of any said pair so a pin may be used to couple said ramp connector cylinders with said frame connector cylinders, said first and fourth pairs being positioned respectively adjacent to said first and second long side ends of said first and second long sides and said second and third pairs being positioned relative to said first and fourth pairs whereby ramps connected to said first and second pairs are properly spaced for driving said vehicle thereon and whereby ramps connected to said third and fourth pairs are properly spaced for driving said vehicle thereon;

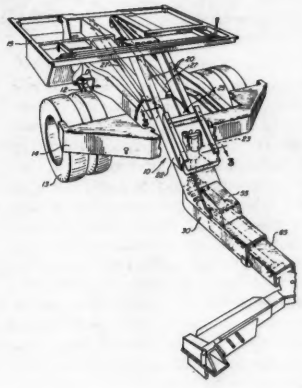
said kit when installed providing means for loading said vehicles on said truck while persevering cargo space in said bed area, providing means for loading said vehicles on said platform and unloading said vehicles from said platform by driving said vehicles forward under their own power in a forward direction, and providing a barrier for preventing said vehicles from being accidentally driven over said first long side during loading from said second long side.

4,874,285

LOW PROFILE VEHICLE LIFTING AND TOWING DEVICE

Leslie Bubik, Toronto, Canada, assignor to Vulcan Equipment Company, Ontario, Canada

Filed Jun. 1, 1988, Ser. No. 200,795
Int. Cl.[4] B60P 3/12
U.S. Cl. 414—563 **11 Claims**



1. A vehicle lifting and towing device comprising:

A column fixably attached to a chassis of a towing vehicle inclined downward and rearward from the towing vehicle at a fixed angle;

a carriage slidably engaged with said column;

a lifting boom housing pivotally connected to a lower rearward portion of the carriage;

at least one lifting cylinder mounted in non-collinear relationship to said column; said lifting cylinder being pivotally connected at one end to an upper forward portion of the carriage and extending toward the front of the towing vehicle and pivotally connected to the chassis of the towing vehicle at its opposite end; and

a tilt cylinder having one end pivotally connected to and

operable within the carriage and the other end pivotally connected to the lifting boom housing.

4,874,286

MANIPULATOR WITH ROD MECHANISM

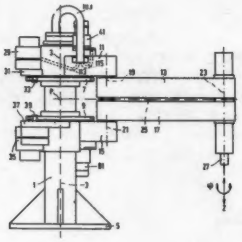
Marinus P. Koster; Henricus J. J. Bouwens; Anton A. J. Van Tartwijk, and Willem L. G. De Peuter, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 4,941, Jan. 20, 1987, abandoned. This application May 20, 1988, Ser. No. 198,618

Claims priority, application Netherlands, Jan. 23, 1986, 8600143

Int. Cl.[4] B25J *18/00*

U.S. Cl. 414—744.5 5 Claims



1. A manipulator comprising a rod mechanism with four arms which are pivotable with respect to each other about a plurality of axes, first and second of said arms being of the same length, separate drive means for each of said first and second of said arms for rotating its associated arm about a main axis each independent of the other, said main axis extending parallel to the axes about which said arms are pivotable and perpendicular to the plane in which each of said arms pivots, a tool holder, third and fourth of said arms each with one end pivotably connected to said first and second arms respectively, said third and fourth arms being of the same length and being pivotably movable with respect to each other at their other ends opposite said one ends about an axis parallel to said main axis, said other ends supporting said tool holder, said first and second arms producing movement of said tool holder radially with respect to said main axis when their drive means drive them with oppositely directed angular velocities about the main axis, said first and second arms producing rotational movement of said tool holder with respect to the main axis when their drive means drive them with angular velocities about the main axis in the same direction, and parallel drive means for moving said tool holder in directions along the axis about which said third and fourth arms pivot independent of movement of any of said arms, said drive means for said first and second arms including an individual electric motor secured to each associated arm, each said motor being rotatable, an associated pinion driven by each said motor when said motor is rotated and an associated toothed ring cooperating with each said pinion for moving its associated arm, each said ring having an axis coinciding with said main axis.

4,874,287

VARIABLE-GEOMETRY TURBOCOMPRESSOR

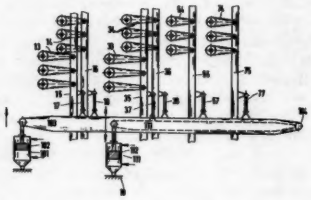
Hubert Grieb, Unterpfaffenhofen, Fed. Rep. of Germany, assignor to MTU Motoren-und Turbinen-Union Munchen GmbH, Fed. Rep. of Germany

Filed Feb. 24, 1987, Ser. No. 17,459

Claims priority, application Fed. Rep. of Germany, Feb. 28, 1986, 3606595

Int. Cl.[4] F01D *17/12*

U.S. Cl. 415—149.2 16 Claims



1. Variable-geometry turbocompressor for compressing a fluid stream having at least one variable compressor inlet stator preceding a first compressor rotor stage, wherein the first compressor rotor stage is directly followed in a compressing flow direction by a first variable stator which includes separate inlet and outlet stator cascades arranged one downstream of the other in tandem construction and wherein the separate inlet stator cascade is adjusted variably and independently of the separate outlet stator cascade so that a compressed fluid stream which exits the first compressor rotor stage is adjustably deflected.

4,874,288

INLET GUIDE VANE ASSEMBLY

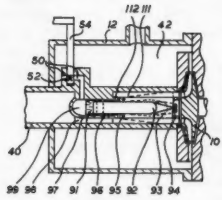
D. Davorin Kapich, 3111 Serrano Dr., Carlsbad, Calif. 92009

Continuation-in-part of Ser. No. 40,858, Apr. 21, 1987, Pat. No. 4,764,088. This application May 3, 1988, Ser. No. 189,653

The portion of the term of this patent subsequent to Aug. 16, 2005, has been disclaimed.

Int. Cl.[4] F04D *29/36*

U.S. Cl. 415—150 10 Claims



1. An inlet guide vane assembly for a pump or a compressor having rotary blades comprising:

a housing means defining an passageway for providing a fluid passageway to said rotary blades,

a plurality of guide vanes, each of said guide vanes being pivotably disposed in said housing means so that by pivoting said vane about a pivot axis said guide vane may be inserted into or removed from said passageway, the extent of such insertion being determined by the degree of pivot of said vane about said axis,

a control means to control the degree of pivot of said guide vanes, wherein the passageway defined by said housing is an circular passageway, wherein said control means com-

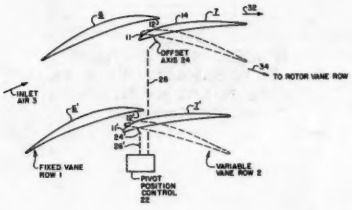
prises an annular piston disposed in said housing means so that axial movement of said piston will apply a force on said plurality of guide vanes causing pivotal movement of said plurality of guide vanes, wherein said control means further comprises a pressure means for applying a pressure differential across said annular piston to cause said piston to move axially, wherein said control means further comprises a counteracting force means to apply forces counteracting forces exerted by said pressure means, wherein said pressure means further comprises a fluid flow passageway means permitting fluid passage from the discharge of said pump or a compressor to said annular piston such that the pressure of said discharge is utilized to apply the pressure differential across said piston, wherein said pressure means further comprises a control valve disposed in said fluid flow passage means and the configuration of said piston in said housing means is such as to permit fluid leakage past such piston so that the pressure on said piston can be controled by adjustments of said control valve.

4,874,289

VARIABLE STATOR VANE ASSEMBLY FOR A ROTARY TURBINE ENGINE

Leroy H. Smith, Jr., and Donald E. Wilcox, both of Cincinnati, Ohio, assignors to United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 26, 1988, Ser. No. 202,660
Int. Cl.[4] F04D *29/36*
U.S. Cl. 415—150 **4 Claims**



1. A preliminary upstream stator vane assembly positioned between an inlet portion of a rotary gas turbine engine and a rotor row thereof, comprising:

(a) a first circumferential row of non-movable leading guide vanes and a second circumferential row of movable trailing guide vanes;

(b) means for positioning the leading nose portion of each movable vane substantially axially ahead of, and adjacent, the trailing edge portion of an associated non-movable vane to form air passage slots; and

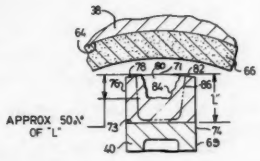
(c) vane angle control means for pivoting each movable vane about a pivot axis displaced away from and in a non-intersecting relationship with respect to said movable vane and wherein each pivot axis of each movable vane is located to maintain widths of said slots substantially constant as said movable vanes are pivoted.

4,874,290

TURBINE BLADE TOP CLEARANCE CONTROL SYSTEM

John N. Cang, San Diego; Joseph R. Gast, Alpine; John J. Hensley, and Christian M. Waldheim, both of San Diego, all of Calif., assignors to Solar Turbines Incorporated, San Diego, Calif.

Filed Aug. 26, 1988, Ser. No. 236,874
Int. Cl.[4] F01D *11/08*
U.S. Cl. 415—173.4 **10 Claims**



1. An axial flow turbine suitable for a gas turbine engine comprising;

a rotatable turbine wheel having an annular array of turbine blades attached thereto;

a shroud assembly having a radially inwardly facing surface positioned adjacent and radially outwardly of said turbine blades;

a coating affixed to the surface, said coating being resistant to high temperature, oxidation, corrosion and sulfidation and being rub-tolerant; and

each of said blades having a metallic body of a predetermined strength sufficient to resist structural deformation at normal operating parameters of the engine and an outer tip formed on the body and positioned adjacent the coating, said outer tip being comprised of a material which has a predetermined strength less than that of the body yet has sufficient strength to prevent breakage thereof and separation from the metallic body during rubbing contact between the tip and the coating, said material being resistant to high temperature, oxidation, corrosion, sulfidation and thermal fatigue at normal operating parameters of the engine, said outer tip being formed on the metallic body by a weld layered puddling build-up using a filler rod having the material as an ingredient thereof wherein said outer tip is made of a nickel base material selected to include approximately 20–24% chromium, 13–15% tungsten and 1–3% molybdenum.

4,874,291

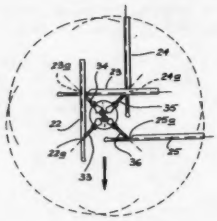
ROTOR ARRANGEMENT FOR A ROTORCRAFT

Bryan W. Roberts, Epping; Alan R. Flen, Ashfield, and John Blackler, Picnic Point, all of Australia, assignors to University of Sydney, Sydney, Australia

Filed May 20, 1988, Ser. No. 196,987
Claims priority, application Australia, May 25, 1987, PI2097
Int. Cl.[4] B64C *27/08*
U.S. Cl. 416—122 **9 Claims**

1. A rotorcraft having four intermeshing rotors coupled to a common drive unit, each rotor comprising a single rotatable blade having a lifting surface and an oppositely projecting substantially non-lifting balance arm, the rotors being coupled to the drive unit by respective rotor shafts and the shafts being inclined with respect to one another such that the path surface traced by each blade during rotation is inclined with respect to each other path surface, each rotor being connected to its associated rotor shaft by way of a mechanism which provides for torque transmission and which permits blade flapping and pitch adjustment, one diagonally positioned pair of the rotors being arranged to be driven so as to co-rotate in one direction

and the other diagonally positioned pair of the rotors being arranged to be driven so as to co-rotate in the opposition



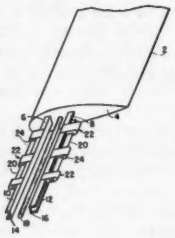
direction, and means being provided for adjusting the pitch angle of each blade.

4,874,292

APPARATUS FOR DAMPING HELICOPTER ROTOR BLADE OSCILLATIONS

David G. Matuska, Beacon Falls, and Donald L. Ferris, Newtown, both of Conn., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 18, 1988, Ser. No. 272,967
Int. Cl.[4] B64C *27/33, 27/38*
U.S. Cl. 416—140 **4 Claims**



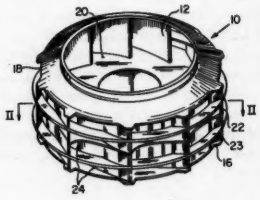
1. Means for damping lead/lag rotor blade motion in a helicopter rotor system of the type having a central hub, radial flexbeams attached at their root ends to the hub, and rotor blades attached at their root ends to the outboard ends of the flexbeams, comprising: a damper beam substantially rectangular in cross section so that it is flexible in the direction of its narrow cross-sectional dimension and rigid in the direction of its wide cross-sectional dimension to permit the damper beam to flex in the narrow cross-sectional mode to allow blade flapping; a plurality of damper beam supporting yokes attached to the flexbeam, the yokes being adapted to hold the damper beam, unconnected to the central hub and unconnected to the rotor blade, adjacent to only a section of the flexbeam, that section of the flexbeam being that where its feathering axis curvature due to lead/lag flexing is at a maximum, the yokes being adapted to secure the damper beam so that it is rigid in the lead/lag mode and flexible in the blade flapping mode, the yokes being adapted to move with the flexbeam; a longitudinal cavity through each damper beam supporting yoke to support the damper beam in the flexbeam plane; elastomeric shear pads mounted on damper beam sections within each cavity; bonding means, binding one side of the shear pad to the damper beam, and the other side to a cavity wall so that when a lead/lag motion causes deflection of the flexbeam, and the rigid damper beam does not bend, the resulting relative motion between the two causes the shear pads to deform in a shear mode; the number of shear pads being such that shearing action damps the flexbeam lead/lag motion without additional damping means.

4,874,293

MODIFIED CENTRIFUGAL AIRFOIL FAN WHEEL

H. Leslie Gutzwiller, 308 Beaver St., Zelienople, Pa. 16063

Filed Nov. 8, 1988, Ser. No. 268,586
Int. Cl.[4] F04D *29/28*
U.S. Cl. 416—184 **11 Claims**



1. A centrifugal airfoil fan wheel comprising:

(a) a plurality of radially extending airfoil shaped blades, each blade having a tail and a nose, said tail having a slot formed within said tail longitudinal said blades;

(b) a spaced back plate and front plate interconnecting each blade along the full extent of the lateral edges of each blade;

(c) a circular center plate spaced intermediate and parallel to said back plate and said front plate and interconnecting each blade along an intermediate portion thereof such that said blades butt against said center plate from both sides; and

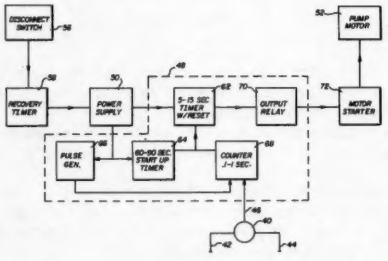
(d) a plurality of stiffener rings encircling and secured to each blade at the outermost portion of said blades within said slots, said back plate, said front plate, and said center plate each having a central concentric opening and said center plate having a plurality of equally spaced cutouts therein, said stiffeners positioned in a plane transverse to an axis passing through said central concentric opening of said back plate, front plate and center plate.

4,874,294

OIL WELL PUMP CONTROL

Thomas A. Karg, 203 W. Fourth St., Oil City, Pa. 16301

Filed May 25, 1988, Ser. No. 198,501
Int. Cl.[4] F04B *49/02*
U.S. Cl. 417—12 **13 Claims**



1. A control system for regulating operation of a power driven pump in a well fluid production system wherein such a power driven pump is operable to pump fluid from a well bore and to deliver such fluid via a production flow path to a storage facility comprising:

a fluid surge amplifying means adapted to be disposed in such a production flow path and operable to amplify fluid surges occurring therein as a result of fluid movement occasioned by operation of such a pump;

surge detection means adapted to operatively communicate with such a production flow path to detect such amplified fluid surges occurring therein;

resettable timer means adapted to be operatively associated with such a power driven pump to initiate an operating cycle of such a pump upon resetting of said resettable timer means and to terminate the operating cycle of such a pump upon timing out of said resettable timer means after a given time period;

controller means operatively connected to said surge detection means and said resettable timer means and operable to reset said resettable timer means and thereby initiate a pump operating cycle upon each detection by said surge detection means of such an amplified fluid surge of at least a minimum given magnitude; and

fluid surge duration measuring means which is operative upon each detected surge of fluid to provide an actuating signal for resetting of said resettable timer means only when the detected surge of fluid is of at least a minimum given duration.

4,874,295

SLANT PLATE TYPE COMPRESSOR WITH VARIABLE DISPLACEMENT MECHANISM

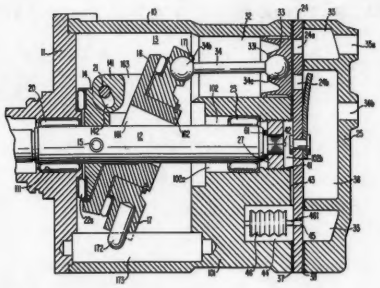
Hideto Kobayashi, and Kiyoshi Terauchi, both of Gunma, Japan, assignors to Sanden Corporation, Gunma, Japan

Filed Mar. 24, 1988, Ser. No. 172,452

Claims priority, application Japan, Mar. 24, 1987, 62-42002[U]

Int. Cl.[4] F04B *1/26*

U.S. Cl. 417—222 **24 Claims**



1. In a compressor including a compressor housing, said compressor housing including a cylinder block, front end plate disposed on one end of said cylinder block, a rear end plate disposed on an opposite end of said cylinder block, said rear end plate having a discharge chamber and a suction chamber formed therein, said cylinder block having a plurality of cylinders formed therein, a crank chamber disposed forward of said plurality of cylinders and enclosed within said cylinder block by said front end plate, a piston slidably fitted within each of said cylinders and reciprocated by a drive mechanism, said drive mechanism including a drive shaft extending through an opening in said front end plate and rotatably supported therein, a drive rotor fixedly attached to and rotatable with said drive shaft, a slant plate attached to said drive rotor and disposed around said drive shaft, said slant plate having a surface disposed at an inclined angle with respect to a plane perpendicular to the longitudinal axis of said drive shaft, said inclined angle adjustable with respect to said plane, and a wobble plate disposed on said slant plate and linked to said pistons to reciprocate said pistons in said cylinders, said cylinder block further comprising a central bore having an axially positionable adjusting screw disposed therein, said adjusting screw dividing said central bore into a front chamber and a rear chamber, said drive shaft extending into said central bore, the axial position of said drive shaft adjustable by said adjusting screw, a communicating path linking said crank chamber to said suction chamber, a valve control means for controlling the opening and closing of said communicating path, the inclined angle of said slant plate changing in response to a change of pressure in said crank chamber, the change in pressure in said crank chamber controlled by the opening and closing of said communicating path by said valve control means, the improvement comprising:

said communicating path including at least one groove formed within said central bore, and linking said front chamber of said central bore to said rear chamber of said central bore, said front chamber also linked to said crank chamber; and

a further groove formed between a rearward surface of said cylinder block and said rear end plate, said further groove linked in fluid communication at one end with said rear chamber, said further linked in fluid communication at an opposite end with said suction chamber, said communicating path thereby linking said crank chamber to said suction chamber.

4,874,296

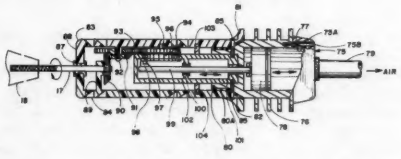
COMPRESSOR ATTACHMENT FOR PORTABLE DRILL

Patrick B. Moynihan, 1517 Charlestown Dr., Edgewood, Md. 21040

Continuation-in-part of Ser. No. 796,178, Nov. 8, 1985, Pat. No. 4,712,983. This application Dec. 14, 1987, Ser. No. 132,344

Int. Cl.[4] F04B *21/00*

U.S. Cl. 417—234 **5 Claims**



1. A compressor attachment for a power drill having a chuck, wherein the power drill may be held in one hand while the compressor attachment is held in the other hand, comprising a housing having a forward portion and a rearward portion and including a pair of complementary mating halves secured together along a common longitudinal midplane, a drive shaft journaled in the housing and extending rearwardly therefrom, the drive shaft having an axis substantially in the common longitudinal midplane of the housing halves, wherein the drive shaft may be secured within the chuck of the power drill, longitudinally-adjustable means carried by the housing and engaging the power drill to preclude the housing from rotating relative to the power drill, a crankcase within the rearward portion of the housing, an eccentric crankshaft within the crankcase, gear means between the drive shaft and the crankshaft, a cylinder within the forward portion of the housing, a piston within the cylinder, means for connecting the piston to the crankshaft, the cylinder having air inlet means and air exhaust means formed therein, an air discharge hose carried by the forward portion of the housing and projecting forwardly therefrom, and means for connecting the air exhaust means in the cylinder to the air discharge hose,

wherein the means carried by the housing and engaging the power drill to preclude the housing from rotating relative to the power drill, comprises at least one sleeve carried by one of the mating halves of the housing, a rod slidably adjustable in the sleeve longitudinally of the housing, means for securing the rod to the sleeve in the desired

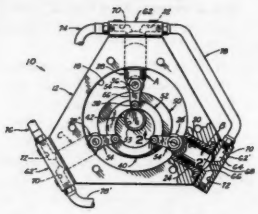
adjusted longitudinal position of the rod, and the rod having a rearward portion bent substantially right-angularly thereto and adapted to rest against the power drill externally thereof.

4,874,297

RADIAL PUMP

Arthur R. Collins, P.O. Box 57078, Oklahoma City, Okla. 73112, and Carroll E. Clarkson, 9505 Ridgeview Dr., Oklahoma City, Okla. 73120

Filed Dec. 19, 1988, Ser. No. 286,182
Int. Cl.[4] F04B *1/04*
U.S. Cl. 417—265 **9 Claims**



1. A rotary pump, comprising:
pump body means having a central chamber and having a plurality of pump cylinders extending outwardly therefrom in a radial array;
a like plurality of pump pistons reciprocable in said pump cylinders;
a like plurality of cylinder head means overlying the outward end of said cylinder bores and forming a cylinder inlet port and a cylinder outlet port for pumping fluid therethrough;
first tubular means connecting a source of fluid with a selected cylinder head inlet port;
second tubular means connecting the cylinder head outlet port of the terminal cylinder head of the radial array;
conduit means extending between and connecting the remaining cylinder head outlet ports, in sequence, to the remaining cylinder head inlet ports of the radial array;
rotary drive means including a drive shaft axially extending into the pump chamber and having a surrounding cam eccentric rotatable therewith;
tether means surrounding an intermediate portion of the drive shaft adjacent the cam;
means extending between and pivotally connected at its respective end portions with the respective piston and said tether means for sequentially reciprocating said pistons in response to angular rotation of said cam eccentric; and,
seal means on the outer end of the respective piston cooperating with the respective cylinder head means for closing said inlet port and said outlet port when the respective piston reaches the outer limit of its travel.

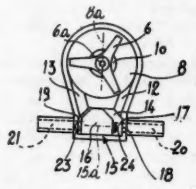
4,874,298

DOUBLE SELECTABLE DELIVERY PUMP

Bruno Mainardi, Padova, and Domenico Vivian, Grumolo Delle Abbadesse, all of Italy, assignors to Nuova Sme S.p.A., Grisignano DI Zocco VI, Italy

Filed Mar. 7, 1988, Ser. No. 164,703
Claims priority, application Italy, Mar. 17, 1987, 41554A/87
Int. Cl.[4] F01D *1/30*; F04B *39/10, 35/04*
U.S. Cl. 417—315 **10 Claims**

1. Double selected delivery pump, comprising a body defining a cylindrical chamber, an impeller with double direction of rotation rotatably arranged in said cylindrical chamber, a compartment in communication with said chamber, delivery conduits in communication with said compartment and valve means controlling the flow of fluid through said delivery conduits, wherein said compartment is a seat, said delivery conduits are arranged to open at opposite ends of said seat, duct means being comprised tangentially connected with said cylindrical chamber and opening into said seat near said opposite ends thereof, andn wherein said valve means are in the form of a distribution element slidably arranged in said seat, said distributor element having shutter means for alternatively closing the fluid flow through said delivery conduits depending on the



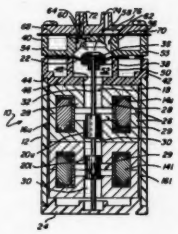
rotation direction of said impeller, wherein said ducts which extend from said cylindrical seat have a parallelepipedal shape and end at respective one of two inclined sides of a first isosceles trapezoid-shaped portion of said distribution seat for said distribution element, said distribution seat defining also a second substantially parallelepipedal portion connected to said first portion, said first and second portions having common longer sides.

4,874,299

HIGH PRECISION PUMP

Benjamin L. Lopez, Golden; Steven A. Beard, Denver, and Kirby Phillips, Lakewood, all of Colo., assignors to Life Loc, Inc., Wheatridge, Colo.

Continuation-in-part of Ser. No. 35,758, Apr. 8, 1987, Pat. No. 4,749,553. This application Jun. 6, 1988, Ser. No. 203,279
Int. Cl.[4] F04B *43/14*
U.S. Cl. 417—413 **5 Claims**



1. An improved pump comprising in combination:
a reciprocally acting motor means comprising a shaft retained for reciprocal movement, first and second magnet means attached to the shaft at predetermined axially spaced locations, first and second electromagnetic means arranged in axial alignment with said shaft and associated with the first and second magnet means respectively, to alternately attract the first and second magnet means when energized,
a flexible diaphragm operatively connected with the shaft to be deflected upon movement of the shaft, and means defining in cooperation with the diaphragm a pumping chamber in which the volume of the chamber varies in relation to the deflection of the diaphragm,
an inlet to the pump chamber, an inlet one-way valve which allows the fluid to flow into the pumping chamber and prevents fluid flow through the inlet out of the pumping chamber, an outlet from the pumping chamber, and an

outlet one-way valve which allows the fluid to exit the pumping chamber and prevents fluid flow through the outlet into the pumping chamber, and

means for alternately energizing and deenergizing the first and second electromagnetic means at a predetermined rate to reciprocate the shaft in alternatively opposite directions with each energization of one electromagnetic means and to deflect the diaphragm at a related predetermined rate to obtain a predetermined volumetric flow through the pumping chamber, and

said first and second electromagnetic means each include a core gap into which the associated magnet means is drawn when the electromagnetic means is energized, and

the core gaps of the first and second electromagnetic means are spaced axially a greater predetermined distance than the axial predetermined spacing of the first and second magnet means on the shaft.

4,874,300

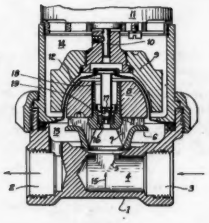
CERAMIC STEP BEARING IN A CENTRIFUGAL PUMP

Karsten A. Laing, 1253 La Jolla Rancho Rd., La Jolla, Calif. 92037; Ludwig Ludin, Kesselackerstr. 23, Anglikon, CH5611, Switzerland, and Johannes N. Laing, 1253 La Jolla Ranch Rd., La Jolla, Calif. 92037

Filed Dec. 21, 1987, Ser. No. 135,733

Int. Cl.[4] F04B *17/00, 35/04*

U.S. Cl. 411—420 **24 Claims**



1. A centrifugal pump-motor assembly comprising an impeller having a magnetically interactive rotor, a driving unit generating a rotating magnetic field having magnetic forces in an axial direction towards a step bearing and generally perpendicular to the plane of said rotating magnetic field, a magnetically permeable wall separating the rotor from the driving unit, wherein the improvement comprises a step bearing comprising:

a convex member partially made of ceramic material;

on a stationary strut fixedly supporting said convex member; and

a rotatably and rockably mounted concave cap attached to said impeller-rotor-unit, said concave cap shaped to be supported by said convex member when proximate and gliding over said convex member wherein said separation wall encloses a common annular gliding region wherein the convex member of the step bearing consists of a ball set in a metal shell, the center region of said shell being fixed to said strut attached to a stationary part of the pump-motor assembly.

4,874,301

FUEL PUMPING APPARATUS

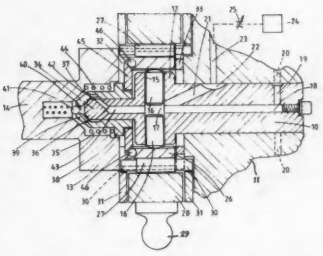
Godfrey Greeves, Hatch End; James C. Potter, London; Richard J. Andrews, Guildford, and Kenneth M. Harris, Maidstone, all of England, assignors to Lucas Industries Public Limited Company, Birmingham, England

Filed Feb. 23, 1988, Ser. No. 159,397

Claims priority, application United Kingdom, Mar. 14, 1987, 8706090; Jan. 16, 1988, 8800958

Int. Cl.[4] F02M *41/14*

U.S. Cl. 417—462 **17 Claims**



1. A rotary distributor fuel pumping apparatus for supplying fuel to an internal combustion engine comprising a rotary distributor member housed in a body, a drive shaft coupled to the distributor member and driven in use in timed relationship with an associated engine, a plunger located within a bore in the distributor member, a plurality of cam lobes formed on a cam ring for imparting inward movement to the plunger as the distributor member is rotated, means for feeding fuel to the bore to effect outward movement of the plunger, further means for distributing the fuel displaced from the bore during successive inward movements of the plunger to a plurality of outlet ports in turn, characterised by a valve member carried by the distributor member and movable relative thereto, the valve member being shaped to engage with a seating to prevent the flow of fuel through a spill path from the bore, mechanical means operable by said cam lobes for moving the valve member away from the seating to open the spill path, the spill path being opened before the inward movement of the plunger under the action of a cam lobe has been completed.

4,874,302

SCROLL COMPRESSOR WITH OIL FEEDING PASSAGES IN THRUST BEARING

Norihide Kobayashi; Tsutomu Inaba; Tadashi Kimura, and Masahiro Sugihara, all of Wakayama, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 8, 1988, Ser. No. 216,309

Claims priority, application Japan, Jul. 8, 1987, 62-171590

Int. Cl.[4] F04C *18/04, 29/02;* **F16C** *33/10*

U.S. Cl. 418—55 **5 Claims**

1. A scroll type compressor which comprises in combination:

a bearing support having guide grooves extending in the diametral direction and an oil returning passage opening in the axial direction;

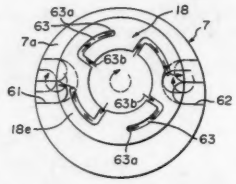
a stationary scroll member having a spiral wrap and fixed on said bearing support;

an orbiting scroll member having a spiral wrap which is combined with the spiral wrap of said stationary scroll member and guide grooves extending in the direction perpendicular to the direction of extension of said guide grooves of said bearing support;

an annular thrust bearing interposed between said orbiting scroll member and said bearing support, and having a

multitude of oil feeding passages, each communicatively connected with said oil returning passage; and

an Oldham coupling disposed on and around said thrust bearing and having claws which slide in and along said both guide grooves,



wherein each said oil feeding passage is so formed as to have a terminal part within a plane of said thrust bearing, and a substantially circumferentially extending part of the passage is made to open at a position where it is intermittently communicating with said guide groove of said orbiting scroll member.

4,874,303

TIRE VULCANIZING PRESS

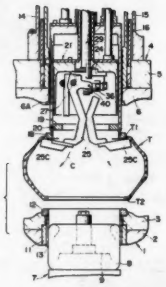
Katumi Ichikawa, Akashi; Itaru Amano, Kobe; Yasuhiko Hujieda, Akashi; Shikao Misumi, Kobe; Seisuke Hukumura, Miki, and Hideo Miyauchi, Kobe, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Oct. 20, 1988, Ser. No. 260,029

Claims priority, application Japan, Mar. 22, 1988, 63-68533

Int. Cl.[4] B29C *35/02*

U.S. Cl. 425—28.1 **5 Claims**



1. A tire vulcanizing press wherein an upper die element and a lower die element are mounted for opening and closing movement relative to each other and a plurality of sectors each having a link extending in a vertical direction and a sectoral portion extending in a radially outward direction from a lower end of said link are mounted in a radial arrangement for movement between an open position and a closed position such that an upper bead of a green tire may be gripped and loaded in position between said die elements by means of said sectors and wherein the inner face of a tire loaded in position between said die elements is shaped and the tire is vulcanized by means of an expandable and contractible elastic forming member and a heated pressurizing medium supplied into said elastic forming member, comprising:

an inner cylinder mounted for relative up and down movement on said upper die element and having at a lower end portion thereof a bead ring adapted to form part of said upper die element, and

a sector housing mounted for relative up and down movement in said inner cylinder and having movably mounted thereon said plurality of sectors for movement between the open position and the closed position;

the upper bead of the green tire being adapted for being gripped between said bead ring provided on said inner cylinder and said sectoral portions of said sectors;

said sectoral portions of said sectors being adapted for being accommodated in the lower end portion of said inner cylinder when said sectors are in the closed position;

an upper mounting ring having said elastic forming member thereon; and

a ring fitting portion being provided for receiving and retaining therein during vulcanization said upper mounting ring.

4,874,304

POROUS MOLD FOR PRESSURE SLIP CASTING

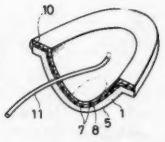
Haruyuki Ito, and Akio Matsumoto, both of Kitakyushu, Japan, assignors to Toto Ltd., Kitakyushu, Japan

Division of Ser. No. 77,657, Jul. 24, 1987. This application Feb. 3, 1988, Ser. No. 152,040

Claims priority, application Japan, Jul. 26, 1986, 61-176370

Int. Cl.[4] B28B *1/26*

U.S. Cl. 425—84 **5 Claims**



1. A porous mold for pressure slip casting, said porous mold comprising:

a surface porous layer having an average pore diameter of at most 20 microns and a thickness of 5 to 40 mm, said surface porous layer having a molding surface and a rear surface located opposite to said molding surface;

an adhesive applied in a pattern to said rear surface of said surface porous layer to leave an unapplied portion on said rear surface;

a coarse porous layer covering the adhesive applied and unapplied portions of said rear surface of said surface porous layer, said coarse porous layer being made of a mixture of a liquid resin and a filler of a particle size of 0.1 to 5.0 mm at a volume ratio of 15 to 50:100, said coarse porous layer having a thickness of 5 to 30 mm;

a sealing adhesive resin covering substantially an outer surface of said coarse porous layer; and

means for passage of water from and air into said coarse porous layer.

4,874,305

ACCUMULATOR EXTRUSION HEAD FOR PRODUCING STRIPED PARISONS

Paul E. McGill, Neshanic, and Frank J. Pitigliano, Bedminister, both of N.J., assignors to Somerset Technologies, Inc., New Brunswick, N.J.

Filed Nov. 3, 1988, Ser. No. 266,689

Int. Cl.[4] B29C *47/54*

U.S. Cl. 425—131.1 **8 Claims**

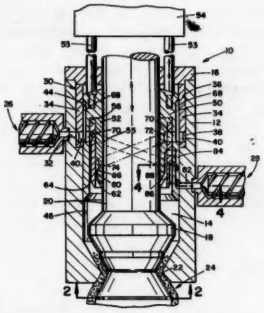
4. An accumulator head for producing a parison having at least one stripe extending longitudinally thereof comprising:

an extrusion head body member and a central mandrel cooperating to define an annular extrusion chamber terminating in an annular outlet nozzle;

an annular ram mounted in said extrusion chamber for reciprocation toward and away from said outlet nozzle;

first supply means for supplying a first extrusion material to said extrusion chamber; and,

second supply means for supplying a second extrusion material to said extrusion chamber, said second supply means including a supply passage means comprising a plurality of small openings extending through said ram and along a



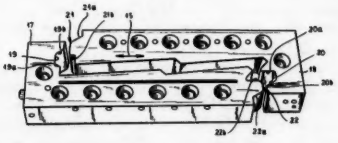
longitudinal direction of said ram for supplying a radially continuous stripe of said second extrusion material through the forward end of said ram to said extrusion chamber during movement of said ram toward said outlet nozzle.

4,874,306

SIDING DIE

Kenton Gearhart, Moundridge, Kans., assignor to American Maplan Corporation, McPherson, Kans.

Filed Nov. 30, 1988, Ser. No. 278,044
Int. Cl.[4] B29C *47/12*
U.S. Cl. 425—192 R **7 Claims**



1. An extrusion die for the extrusion of a wide thin workpiece from a synthetic resin, comprising:

a die body formed with a passage for an extrudable synthetic resin; and

a die lip detachably mounted on said body and defining a die orifice having substantially a shape corresponding to the cross section of said workpiece, said die lip being of substantially rectangular parallelepipedal configuration and consisting exclusively of:

a first elongated lip member having a contoured surface defining one side of said orifice along one side of said first lip member,

a second elongated lip member having a contoured surface defining an opposite side of said orifice along one side of said second lip member juxtaposable with said one side of said first lip member, said lip members being relatively shiftable in a direction generally parallel to the longitudinal dimensions of said members, said orifice being elongated in said direction and said members being formed with mutually engageable sealing surfaces at each end of said orifice extending generally in said direction;

respective formations on opposite ends of said lip members matingly engageable upon movement of said lip members in said direction and including, at each end of said orifice, respective pairs of mating surfaces inclined to said direction and forcing said lip members against one another at said sealing surfaces upon relative movement of said lip members in said direction, and

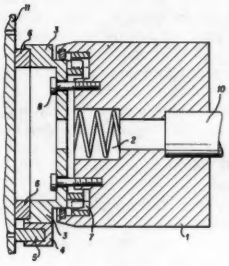
means interconnecting said lip members generally in said direction for displacing said lip members relatively in said direction, said means interconnecting said lip members generally in said direction comprising a respective pair of screws traversing each of said members and threaded into the other of said members at respective ends of said members, said screws extending generally parallel to said sealing surfaces, said formations including a respective projection on a respective end of each of said lip members and formed in one piece therewith, extending transversely to said direction and mating with the other end of the other lip member, each of said other ends mating with a respective projection being formed unitarily with a nose projecting in said direction and formed with both a respective one of said inclined surfaces and a respective one of said sealing surfaces, each projection having a recess complementarily shaped to the respective nose and receiving same with a clearance of about 0.005 to 1 mm in said direction.

4,874,307

CUTTING DEVICE FOR HIGH-TEMPERATURE GRANULATION OF THERMOPLASTIC POLYMERS

Lucia Comper, Castel D'Ario, and Francesco Ferrari, Virgilio, both of Italy, assignors to Montedipe S.p.A., Milan, Italy

Filed Nov. 2, 1987, Ser. No. 115,118
Claims priority, application Italy, Nov. 3, 1986, 22214 A/86
Int. Cl.[4] B29B *9/00*
U.S. Cl. 425—311 **15 Claims**



1. A cutting device for high-temperature granulation of thermoplastic polymers, which comprises:

(a) a rotor adapted to be rigidly keyed on a drive shaft;

(b) a blade-carrier disc on which a thrust bearing is coaxially applied;

(c) blades which are adapted to face a cutting plate and which are rigidly attached to the bladecarrier disc; and

(d) an articulated system located between the rotor and the disc.

4,874,308

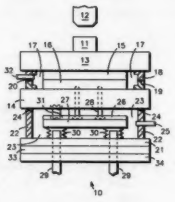
VACUUM ASSISTED TRANSFER MOLD AND VENT PIN

George N. Atlas, 30 E. Brown Rd. #1102, Mesa, Ariz. 85201; Leroy C. Donnally, 3425 N. 42nd St., Phoenix, Ariz. 85018; Donald P. Urban, 2639 W. La Senda, Mesa, Ariz. 85202; James M. Perkins, 2230 W. Hayward, Phoenix, Ariz. 85021, and Timothy C. Wilson, 42798 Twilight Ct., Rancho California, Calif. 92390

Filed Apr. 4, 1988, Ser. No. 177,195
Int. Cl.[4] B29C *45/02, 45/34*
U.S. Cl. 425—544 **10 Claims**

1. A vacuum assisted transfer mold comprising:

mold plate means for forming a cavity about a device to be encapsulated;
a top mold base coupled to the top of said mold plate means;
a bottom mold base coupled to the bottom of said mold plate means;
first vacuum wall means for creating an atmospheric seal about said mold plate means, said first vacuum wall means being disposed between said top and bottom mold bases;
a backup plate coupled to said bottom mold base opposite said mold plate means;
an opening extending through said bottom mold base;
a vent pin extending through said opening in said bottom mold base into said mold plate means;
vent pin retaining means for retaining a base portion of said pin, said retaining means being disposed between said bottom mold base and said backup plate; and
second vacuum wall means for creating an atmospheric seal about said vent pin retaining means, said second vacuum



wall means being disposed between said bottom mold base and said backup plate;
said vacuum wall means including means through which a vacuum can be applied to said transfer mold;
said vent pin retaining means including means for axially moving said vent pin within said openng in said bottom mold base to cause said vent pin to enter said cavity and function as an ejector;
said vent pin having first and second surface portions therealong that are configured to cooperate in said opening in said bottom mold base whereby said vent pin operates to vent said cavity and clean said opening in said bottom mold base;
a seal capable of reciprocal motion coupled between said vent pin retaining means and said backup plate; and
a push rod extending through said backup plate and surrounded by said seal to enable said vent pin retaining means to be reciprocated between said backup plate and said bottom mold base.

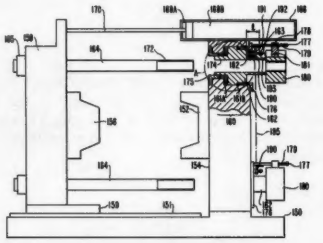
4,874,309

DIE CLAMPING APPARATUS

Yuki Kushibe, and Hiroshi Sato, both of Nagoya, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 8, 1988, Ser. No. 204,528
Claims priority, application Japan, Jun. 22, 1987, 62-153542; Jun. 24, 1987, 62-157154
Int. Cl.[4] B29C *45/66*
U.S. Cl. 425—589 **4 Claims**

1. A die clamping apparatus comprising:
a fixed die plate immovably fixed in the apparatus, said fixed die plate having a mounting surface for supporting a fixed die;
a movable die plate movably supported in the apparatus, said movable die plate having a mounting surface for supporting a movable die opposite to the fixed die, and
moving means operatively connected to said movable die plate for causing said movable die plate to advance toward said fixed die plate and close said dies and for causing said movable die plate to retreat from said fixed die plate and open said dies;
tie bars fixedly secured to one of said die plates and immovable relative to said one of said die plates,
said tie bars each including a first end from which the tie bars extend from said one of said die plates toward the other of said die plates, a tip end opposite said first end, and one of a thread and a series of grooves extending along the outer circumferential surface of said tip end;
hydraulic cylinders disposed on the other of said die plates across from said tie bars, respectively,
each of said hydraulic cylinders including a ram having an insert hole extending therethrough in an axial direction aligned with a respective one of said tie bars, the tip end of each of said tie bars extending through a respective said insert hole when said dies are closed,
each said ram being movable in a direction parallel to said axial direction;
a respective coupling means operatively associated with each of said tie bars, supported by said other of said die



plates and movable relative thereto in directions parallel to said axial direction, and positioned adjacent a surface of said other of said die plates opposite the mounting surface thereof,
each said coupling means having a peripheral surface that is complimentary to said one of said thread and series of grooves extending along the tip end of a respective one of said tie bars, and
said peripheral surface movable, in directions perpendicular to said axial direction, into and out of mating engagement with said one of said threads and series of grooves of said respective one of said tie bars when said dies are closed so as to couple said die plates through said tie bars;
means for causing said coupling means to move in said axial direction with said ram; and
stopper means operatively connected to each said coupling means for adjustably setting a relative position, in said axial direction, of said coupling means and the tip ends of said tie bars with respect to when said dies are closed.

4,874,310

LOW NOX BURNER

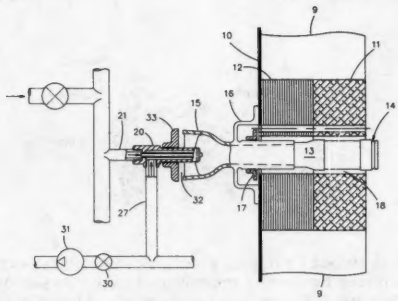
Howard Seemann, Seaford, N.Y., and Chad F. Gottschlich, Philadelphia, Pa., assignors to Selas Corporation of America, Dresher, Pa.

Filed Feb. 25, 1988, Ser. No. 160,265
Int. Cl.[4] F23C *7/00*
U.S. Cl. 431—8 **19 Claims**

1. A controlled primary air inspirating gas burner comprising:
a burner body having a burner tip adapted to be installed in a furnace or the like for combustion of gaseous fuel therein,
a fuel inspirating jet positioned in said body upstream of said tip and having an open gaseous fuel orifice for introduction of gaseous fuel into said burner body,
means for supplying gaseous fuel under pressure to said inspirating jet,
means forming an induced primary air passageway upstream

of said burner tip for flow of induced primary air into said body for mixing with said gaseous fuel prior to exiting said burner tip,

means forming a separate control primary air passageway located upstream of said induced primary air passageway and extending into said burner body adjacent said inspirating jet for separately introducing control primary air into said body,



pressure means connected to introduce said control primary air into said fuel inspirating jet, and

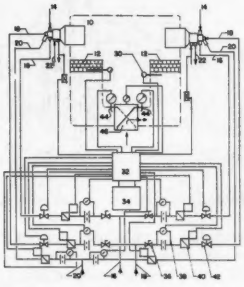
separate control means for controlling the rate of introduction of said control primary air into said burner body, whereby the NOx content of the resulting flue gas can be reduced in the absence of secondary air.

4,874,311

METHOD AND APPARATUS FOR IMPROVED REGENERATIVE FURNACE

Gregory M. Gitman, Duluth, Ga., assignor to American Combustion, Inc., Norcross, Ga.

Filed Aug. 3, 1987, Ser. No. 60,420
Int. Cl.[4] F27B *14/00*
U.S. Cl. 432—13 **13 Claims**



1. A method of melting material in a regenerative furnace comprising the steps of:

(a) directing a stream of preheated combustion air toward the interior of said furnace;

(b) introducing controllable amounts of an auxiliary fuel into a combustion chamber;

(c) introducing an auxiliary oxidizing gas into said combustion chamber so that said oxidizing gas mixes with said auxiliary fuel and combusts to produce hot combustion products;

(d) directing a main fuel into said combustion chamber so that said main fuel is pyrolyzed by said hot combustion products to produce a hot luminous stream of combustible gas; and

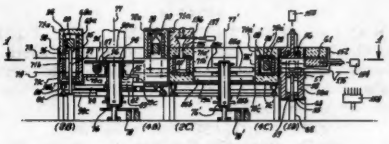
(e) directing said hot luminous stream of combustible gas from said combustion chamber to the interior of said furnace to mix with said combustion air to form a final luminous flame envelope to heat the material to be melted.

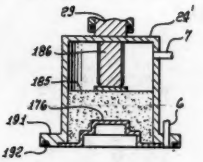
4,874,312

HEATING AND HANDLING SYSTEM FOR OBJECTS

Robert W. Hailey, 2030-229 Beverly Plaza, Long Beach, Calif. 90815

Division of Ser. No. 948,229, Dec. 31, 1986, Pat. No. 4,758,157, which is a continuation-in-part of Ser. No. 710,541, Mar. 11, 1985, Pat. No. 4,634,375. This application Jun. 3, 1988, Ser. No. 201,842
Int. Cl.[4] F27B *9/00*
U.S. Cl. 432—122 **4 Claims**





1. In combination, a shell at an entry port of an entry chamber associated with a processing chamber that contains furnace means, and conformable structure carried by the shell, the conformable structure configured to be moved to fit the top of a charge to be entered into the entry chamber, said structure providing operating means to displace atmospheric gas in the entry chamber out of the space between that structure and the top section of a charge supporting base adapted to closely fit the bottom of the charge at said entry port of said entry chamber.

4,874,313

REFRACTORY CLAD LID FOR HEATING VESSEL

Ronald L. Schwenninger, Ridgeley, W. Va., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sep. 26, 1988, Ser. No. 248,678
Int. Cl.[4] F27D *1/00*
U.S. Cl. 432—247 **4 Claims**

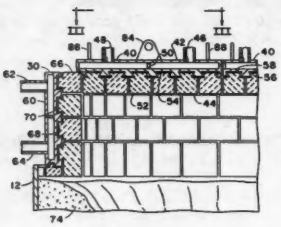
1. A protective panel for a heating vessel comprising:

a hollow support member having an engagable surface;

a plurality of refractory blocks having an engagable surface, wherein said engagable surfaces of said support member and blocks include grooves and projections interlocking with said grooves so as to maintain said refractory blocks along said member in generally abutting relationship to form a refractory facing;

means for mounting said support member to position said refractory facing toward the inside of said heating vessel; and

means to circulate cooling fluid through said support member to cool said refractory facing and prevent deterioration of said blocks from a hostile environment within said vessel.



4,874,314

SOCKET TO CLAMPINGLY HOLD DENTAL TOOLS

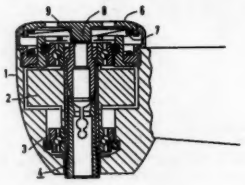
Ernst O. Fleer, Bensheim; Hermann Landgraf, Lorsch, and Werner Schwarz, Heppenheim, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 11, 1987, Ser. No. 132,008

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1986, 3644055

Int. Cl.[4] A61C *1/14*

U.S. Cl. 433—129 **16 Claims**



1. A socket for clamping a cylindrical shaft of a dental tool, said socket having an outer sleeve, a clamping sleeve, and a displaceable ram, said outer sleeve having means for mounting the socket for rotation in a housing, said ram being inserted in said outer sleeve and being freely, axially displaceable between a position adjacent a first end of the outer sleeve and an inwardly disposed position that is closer to a second end of said outer sleeve, said ram having outer tapering surfaces extending at an angle to the axis of said outer sleeve on an end of the ram pointing towards said second end of said outer sleeve, said clamping sleeve having longitudinal slots extending inward from a first end to form resilient tongues, each of said tongues having an inner tapering surface extending at an angle to the axis of the clamping sleeve, said clamping sleeve being inserted into the outer sleeve with the first end of the clamping sleeve adjacent the outer tapering surfaces of said ram, means for securing the clamping sleeve in an axially immobile position in the outer sleeve, said ram being moved from a retracted position towards the clamping sleeve with the tapering surface of the ram coacting with the tapering surfaces of the tongues to urge the tongues from a closed position on a shaft of a tool inserted in the clamping sleeve to a radially outward unclamping position to release said tool, said angle of the outer tapering surfaces being greater than the angle of the inner tapering surfaces so that the contact between tapering surfaces of each tongue and ram form substantially a line contact with one another that is offset from the slots while in the unclamping position.

4,874,315

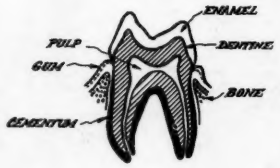
METHOD FOR BONDING OF RESTORATIVE MATERIALS TO A TOOTH

John D. B. Featherstone; Lyndon F. Cooper, both of Rochester; Michael L. Myers, Pittsford, all of N.Y., and Dennis G. A. Nelson, Wellington, New Zealand, assignors to Eastman Dental Center, Rochester, N.Y.

Filed Feb. 19, 1987, Ser. No. 16,250

Int. Cl.[4] A61C *5/00*

U.S. Cl. 433—215 **14 Claims**



1. A method for treating a tooth with a restorative material comprising the steps of pretreating at least a portion of the surface area of the dentin or cementum of said tooth with light from a laser, which is of a wave length between 9.0 and 11.0 micrometers for a duration sufficient to apply about 5 J of laser energy to said dentin or cementum, and then applying a restoring material to the pretreated surface area of said tooth.

4,874,316

CONNECTOR APPARATUS

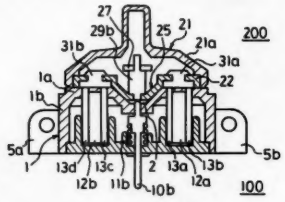
Yoshiyuki Kamon; Akira Ogiwara, both of Kanagawa, and Koji Nageno, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 12, 1988, Ser. No. 180,847

Claims priority, application Japan, Apr. 30, 1987, 62-107342

Int. Cl.[4] H01R *11/30*

U.S. Cl. 439—39 **5 Claims**



1. A connector apparatus for a stereo headphone comprising:

a) a plug including a first housing having a first contact face and a convex mating portion formed on said first contact face, said convex mating portion being in the shape of a truncated pyramid but with one side of the pyramid having a different angle of inclination than the opposite side, a plurality of first terminals including left and right terminals for stereo and an earth terminal, said terminals being accommodated in said first housing and having one end exposed to the outside of said first housing from said convex mating portion, a plurality of electrical leads separately connected between different ones of the other ends of said first terminals and said stereo headphone, and a first magnetic coupling means located at both sides of said convex mating portion; and

b) a socket including a second housing having a second contact face and a concave mating portion formed on said second contact face, said concave mating portion being in the shape of a truncated pyramid but with one side of the

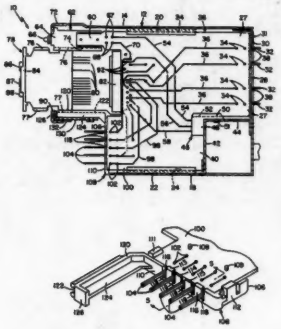
pyramid and the other side of the pyramid having corresponding angles of inclination to those of said one side and the opposite side of the pyramid of said plug, a plurality of second terminals including left and right terminals for stereo and an earth terminal, said second terminals being accommodated in said second housing and exposed to the outside of said second housing at their ends from said concave mating portion, and a second magnetic coupling means located at both sides of said concave mating portion on said second contact face.

4,874,317

JACKFIELD WITH FRONT TERMINALS

Frederick L. Lau, Skokie, Ill., assignor to Switchcraft, Inc., Chicago, Ill.

Filed Aug. 15, 1988, Ser. No. 232,358
Int. Cl.[4] H01R 9/09; H05K 7/10
U.S. Cl. 439—54 **3 Claims**



1. A printed circuit board assembly comprising:

a printed circuit board having an edge with a right angle connector adapted for receiving and removably mating with an electrical jack module, said printing circuit board having a plurality of printed circuit conductors with respective end portions disposed in spaced relationship with one another at a portion of said edge adjacent to said right angle connector;

a linear array of laterally spaced terminals disposed along said portion of said edge, each of said terminals having a proximal end portion connected electrically to a respective one of said end portions of said conductors and having a distal end portion projected outwardly of said edge of said board; and

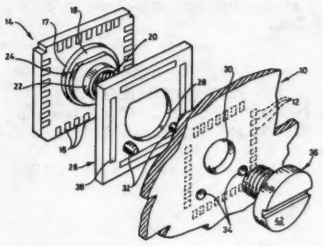
a dielectrical bracket having a first leg disposed along said portion of said edge and being secured to said board, said bracket having an orthogonal second leg integrally joined to an end portion of said first leg and projected outwardly of said edge of said board, said first leg of said bracket having disposed therein a linear array of mutually spaced apertures through which respective distal end portions of said terminals extend, said orthogonal second leg of said bracket having a collinear surface provided with a channel adapted for receiving said electrical jack module in sliding engagement.

4,874,318

MOUNTING ARANGEMENT FOR A CHIP CARRIER

Arthur T. Spencer, Biggleswade, United Kingdom, assignor to Flexicon Systems Limited, Cambridge, United Kingdom

PCT No. PCT/GB88/00183, § 371 Date Nov. 2, 1988, § 102(e) Date Nov. 2, 1988, PCT Pub. No. WO88/07807, PCT Pub. Date Oct. 6, 1988
PCT Filed Mar. 10, 1988, Ser. No. 269,740
Claims priority, application United Kingdom, Mar. 31, 1987, 8707663; May 8, 1987, 8710951
Int. Cl.[4] H01R 23/72
U.S. Cl. 439—71 **10 Claims**



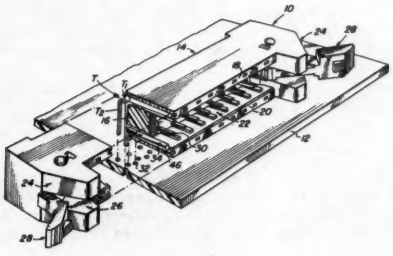
1. A mounting arrangement for mounting an integrated circuit chip carrier to a printed circuit board (pcb), comprising a first fastener for fixedly attaching to the chip carrier, a socket moulding carrying interconnection elements for establishing electrical connection between interface contacts on the chip carrier and interface contact pads on the pcb, said socket moulding being apertured to receive said first fastener of the chip carrier, and a second and complementary fastener for extending through an aperture in the pcb for engagement with said first fastener to clamp the socket moulding between the chip carrier and the pcb with said interface contacts and said contact pads interconnected by said interconnection elements.

4,874,319

TERMINAL LEAD SHIELDING FOR HEADERS AND CONNECTORS

Alexander W. Hasircoglu, Lancaster, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 20, 1988, Ser. No. 222,090
Int. Cl.[4] H01R 4/66
U.S. Cl. 439—108 **23 Claims**



1. An electrical connection device comprising:

a housing having at least one row of spaced apart electrical contacts for effecting connection with respective contacts of a complementary type, each said electrical contact having a tail portion having a first segment extending in a rearward direction from said housing and a second seg-

ment extending at an angle in a selected direction relative to its first segment;

a first row of spaced apart ground contacts on one side of said row of electrical contacts and a second row of spaced apart ground contacts on the other side of said row of electrical contacts, each said ground contact having a tail portion having a first segment extending in a rearward direction from said housing and a second segment extending at an angle in the selected direction relative to its first segment, the respective tail portions of said first and second rows of ground contacts arranged intermediate said tail portions of each of said electrical contacts, and

wherein respective said second segments of said tail portions of said electrical contacts and said ground contacts extend at a substantially right angle relative to their respective said first segments.

4,874,320

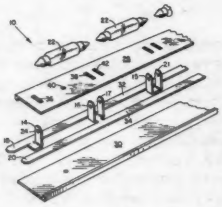
FLEXIBLE LIGHT RAIL

Herbert D. Freed, P.O. Box 370375, Miami, Fla. 33137, and Dennis Leach, 211, Tottenhall Rd., Palmers Grn, London, England

Filed May 24, 1988, Ser. No. 198,083

Int. Cl.[4] H01R *4/66*

U.S. Cl. 439—115 **23 Claims**



1. An apparatus for supporting a plurality of lighting fixtures comprising:

a first conductive strip having a first plurality of lateral extensions connected thereto, each of said first plurality of lateral extensions having attached thereto one or more first contact tabs, said first contact tabs being generally perpendicular to the surface of said first conductive strip;

a second conductive strip essentially parallel to said first conductive strip creating a space therebetween, said second conductive strip having a second plurality of lateral extensions connected thereto, each of said second plurality of lateral extensions having attached thereto one or more second contact tabs, said second contact tabs being generally perpendicular to the surface of said second conductive strip, said first and second contact tabs being located along said space between said first and second conductive strips; and

means for electrically insulating said first and second conductive strips.

4,874,321

ADAPTER

Hans Wagener, Dietzholztal, and Jurgen Zachrei, Dillenburg, both of Fed. Rep. of Germany, assignors to Rittal-Werk Rudolf Loh GmbH & Co., KG, Herborn, Fed. Rep. of Germany

Filed Dec. 11, 1987, Ser. No. 131,750

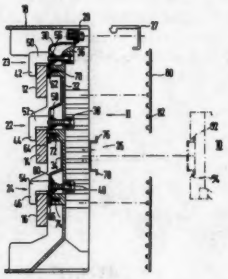
Claims priority, application Fed. Rep. of Germany, Dec. 12, 1986, 3642517

Int. Cl.[4] H01R *25/14, 4/30*

U.S. Cl. 439—119 **13 Claims**

1. An adapter apparatus for mechanical and electrical connection of installation devices such as automatic circuit breakers, motor protection switches, contactors, relays, and the like with bus rails of a bus bar system which can accommodate installation devices equipped with mounting feet for standard mounting brackets, comprising:

an adapter housing which may be placed over the bus rails, the housing having a front and a rear;



at least one contact bar secured to the housing, the contact bar extending to the front side to form lead connector points;

an adjustable clamp secured to each contact bar and facing a respective bus rail; and

means on the front of the adapted housing for mounting of installation devices.

4,874,322

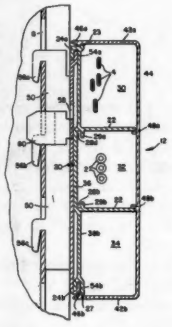
SURFACE APPLIED WIRING APPARATUS

Frank P. Dola, Hudson; Steven Feldman, and John K. Erwin, both of Seminole, all of Fla., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 28, 1987, Ser. No. 101,713

Int. Cl.[4] H02G *3/04*

U.S. Cl. 439—210 **23 Claims**



1. An assembly for use in deploying wires along a wall comprising a raceway with elongate compartments for housing the wires, the raceway comprising at least one elongate member with a rear panel, the elongate compartments being located along the interior of the rear panel, the rear panel having at least one elongate tongue and groove on the exterior, each tongue being spaced from the rear panel with said groove formed between the tongue and the exterior of the rear panel, the assembly further comprising a plurality of hanger brackets, each securable to the wall and engagable with the rear panel, each hanger bracket having at least one protruding lip received within the groove on the rear panel when the raceway is

mounted on said hanger brackets secured to the wall, the rear panel of the raceway comprising an extruded member having a constant cross section along its length, the groove formed between the tongue and rear panel being continuous so that the raceway can be mounted on said hanger brackets at any position along its length.

4,874,323

CONNECTOR

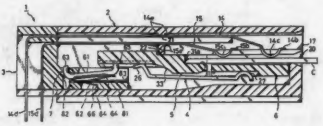
Yasuji Shibano, Izumisano, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Oct. 28, 1988, Ser. No. 264,037

Claims priority, application Japan, Nov. 11, 1987, 62-172107[U]

Int. Cl.[4] H01R 9/09

U.S. Cl. 439—260 **5 Claims**



1. A connector comprising:

A connector body provided in the front side thereof with a card inserting/removing port:

contact pieces disposed, at predetermined spatial intervals, in the inner part of said card inserting/removing port in said connector body;

a resettable slider in said connector body adapted to be moved from an advance position to a retreat position by a card inserted through said card inserting/removing port; and

a swing member disposed at the opposite side of said slider to the side thereof on which said contact pieces are disposed, and extending over said slider and a card inserted through said card inserting/removing port, said swing member being supported by said connector body so as to be swingable around the axis of said swing member, said axis being at a right angle to a card inserting/removing direction,

whereby, as said slider is moved from said advance position to said retreat position, one swing end of said swing member is pushed by said slider and displaced in a direction away from said contact pieces, and the other swing end of said swing member is displaced in a direction toward said contact pieces, causing the card inserted through said card inserting/removing port to be moved in a direction toward said contact pieces, such that the terminals of said card come in contact with contact portions of said contact pieces.

4,874,324

UNDERWATER ELECTRICAL CONNECTOR

James K. Andersen, Arnold, and Carl L. Hikes, Severna Park, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 3, 1988, Ser. No. 227,576

Int. Cl.[4] H01R 13/52

U.S. Cl. 439—271 **6 Claims**

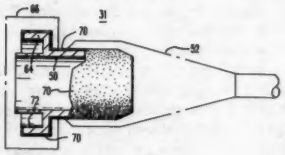
1. In an underwater electrical connector, the improvement comprising:

(A) a generally cylindrical metallic connector shell;

(B) at least one electrical conductor positioned within the interior of said shell;

(C) an encapsulating boot surrounding a portion of said shell;

(D) a protective plastic coating deposited on the surface of said shell at least in the area where surrounded by said boot as well as areas which may be exposed to the ambient water medium;



(E) said boot being in intimate bonded contact with said coating.

4,874,325

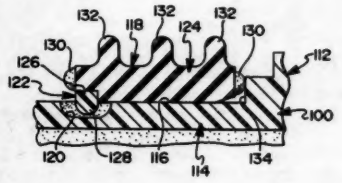
ELECTRICAL CONNECTOR WITH INTERFACE SEAL

Gregory L. Bensing; Joseph H. Gladd, both of Courtland, and John A. Yurtin, Southington, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 23, 1988, Ser. No. 248,059

Int. Cl.[4] H01R 13/52

U.S. Cl. 439—272 **10 Claims**



1. An electrical connector having an interface sealing arrangement comprising:

a thermoplastic connector body which houses a plurality of electrical terminals and which has a plug portion of reduced size which serves as mounting surface for an interface seal,

said plug portion having a conformation which opens onto the mounting surface,

said interface seal having a sealing portion which is made of an elastomeric material and a retainer portion which is made of thermoplastic material or elastomeric material having a higher durometer than the elastomeric material of the sealing portion,

said retainer portion including a portion which snaps into the conformation which opens onto the mounting surface to assure that the interface seal is always correctly positioned for sealing engagement with a mating connector body.

4,874,326

ELASTOMERIC ELECTRICAL ISOLATION MEMBRANE

Victor J. Marolda, Jr., Salem, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 20, 1988, Ser. No. 246,703

Int. Cl.[4] H01R 13/52

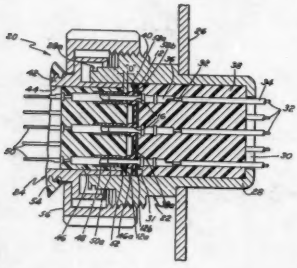
U.S. Cl. 439—273 **2 Claims**

1. In combination with an open face pressure tolerant plug to receptacle type electrical connector and a dielectric grease, an electrical isolation membrane, comprising:

a circular dielectric elastomer disk having a preselected diameter "d_1", thickness "t" and Shore durometer; and

a plurality of dielectric cylindrical elastomer embossments, each embossment having a longitudinal centerline arranged orthogonally with respect to the plane of said

elastomer disk, each embossment being fixedly attached to said elastomer disk at a preselected location so as to form a preselected pattern having at least an embossment spacing "y", each said embossment having an outside diameter "d_2" slightly larger than the corresponding socket cavity of said receptacle it will contact and an inside diameter "d_3" slightly smaller than the pin diameter of said plug, each of said plurality of embossments further comprises first and second conical ends, each end having an identical surface of preselected angle "x" formed thereon with respect to said embossment centerline, at least one said conical surface being disposed a preselected height "h" above the surface of said elastomeric disk;



said membrane being coated with said dielectric grease and disposed between said plug and said receptacle of said electrical connector, said plug and said receptacle then being engaged and tightened whereby said embossments first contact said socket cavities, then purge said dielectric grease and water from said cavities, and when fully tightened employ hydrostatic pressure produced from tightening to squeeze out most remaining grease and water while any remaining water is broken up into a discontinuous series of microspheres, said dielectric grease coated membrane thereby providing electrical isolation between pins of said plug while said connector has been assembled in an aqueous environment.

4,874,327

UNIVERSAL CABLE HEAD FOR A MULTICONDUCTOR LOGGING CABLE

Matthew Ip, Austin, Tex., assignor to Halliburton Logging Services, Inc., Houston, Tex.

Filed Nov. 7, 1988, Ser. No. 267,854
Int. Cl.[4] H01R *7/02*
U.S. Cl. 439—275 **10 Claims**

1. A universal cable head which comprises:

(a) an armored logging cable having up to seven electrical conductors therein and incorporating a woven wire rope, and a surrounding armor wrap;

(b) stress relieving stinger means on said cable;

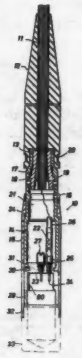
(c) an encircling housing on the end of said cable having an external shoulder thereon connecting with said stress relieving stinger to transfer axial loads from said cable to said housing;

(d) an internal transverse bulkhead within said housing adjacent to an internal cavity therein;

(e) electrical feedthrus supported by said transverse bulkhead, said feedthrus having a cable end formed with terminals for connection of conductors in said logging cable;

(f) exposed mating connectors in a prearranged pattern supported by said bulkhead, said connectors being electrically connected to said feedthrus;

(g) said housing extending past and encircling said mating connectors; and



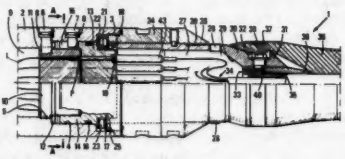
(h) a rotatable, shoulder limited sleeve on the exterior of said housing having threading means thereon for connecting with a mating female connector.

4,874,328

CONNECTION DEVICE FOR THE MECHANICAL AND ELECTRICAL CONNECTION OF A MULTI-CONDUCTOR CABLE TO A WELL PROBE

Jean-Claude Le Dall, route de l'Empereur, and Jean-Claude Marchand, Les Millepertuis, both of France, assignors to Institut Francais du Petrole et Geomecanique, Rueil-Malmaison, France

Filed May 4, 1988, Ser. No. 190,153
Claims priority, application France, May 5, 1987, 87 06360
Int. Cl.[4] H01R *13/52*
U.S. Cl. 439—278 **8 Claims**



1. A connection device for the electric and mechanical connection of a well-probe to a multi-conductor cable to the end of which the probe is lowered into a well or bore hole, comprising electric connection means for connection between different electric conductors in the well-probe and conductors of the multi-conductor cable and mechanical connection means for fixing the cable to the end of the well probe, wherein the electric connection means comprises a separation disk with a tubular extension and a female electric connector able to penetrate into the tubular extension, the separation disk being provided with sealed passages for a set of pins which are adapted, on one side thereof for plugging on to a set of hollow rods electrically connected to the conductors of the cable and on the opposite side on female pins of the electric female connector, which are electrically connected to the conductors inside the probe, and the mechanical connection means include an annular sleeve having at one end a fitting associated with means for retaining the cable and adapted for receiving at its opposite end a terminal part of a body of the probe which includes cavities capable of containing the separation disk and the female electric connector; the mechanical connection means including fool-proof means cooperating with the separa-

tion disk, the female electric connector and the sleeve for a proper angular orientation of the same with respect to one another, and means for securing the annular sleeve to the terminal part of the body of the well-probe, said mechanical connection means acting by drawing the annular sleeve and the terminal part together, to form a correct electrical connection between the disk and the female electric connector and to isolate inside of the body sealingly from the well.

4,874,329

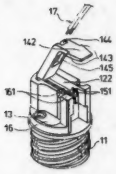
SOCKET ASSEMBLY

Kuang-Shih Yu, 10F, 546, Min Chuan E. Rd., Taipei, Taiwan

Continuation-in-part of Ser. No. 97,511, Sep. 15, 1987, Pat. No. 4,781,616. This application Oct. 24, 1988, Ser. No. 261,982

Int. Cl.[4] H01R *4/24*

U.S. Cl. 439—409 **3 Claims**



1. A socket assembly having a screwshell provided for holding an electric lamp bulb, an insulating plate for being positioned on top of the screwshell, and a positive terminal member disposed in the screwshell with one end extending through the top thereof, comprising:

a non-conductive body with an L-shaped recess in a middle portion fixedly connected to the screwshell at a lower end by a plurality of riveting pins;

conducting means disposed on said non-conductive body and having two piercing terminal portions respectively connected to the screwshell and the positive terminal member for effecting electrical connections therewith;

a coupling means, formed in shape of an "L" with a horizontal portion and a vertical portion in conjunction with said L-shaped recess, pivotally connected to said non-conductive body for enabling close engagement with said L-shaped recess, having an accommodating means therein for receiving two electrical cords while permitting the electrical cords to be exposed in registry with said conducting means, rotatable to press said electrical cords against said conducting means so that said piercing terminal portions of said conducting means may be inserted into the electrical cords and achieve electrical connection, respectively; and

a retaining means for retaining said coupling means within said L-shaped recess of said non-conductive body.

4,874,330

CAPACITY MODULAR PLUG

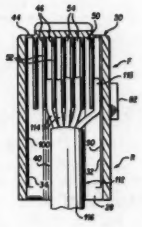
Stephen B. Bogese, II, and Charles E. Hall, both of Roanoke, Va., assignors to Virginia Plastics Company, Roanoke, Va.

Continuation of Ser. No. 178,853, Mar. 29, 1988, abandoned, which is a continuation of Ser. No. 73,294, Jul. 7, 1987, abandoned, which is a continuation of Ser. No. 805,571, Dec. 2, 1985, abandoned, which is a continuation of Ser. No. 588,565, Mar. 12, 1984, abandoned. This application Mar. 3, 1989, Ser. No. 318,514

Int. Cl.[4] H01R *4/24*

U.S. Cl. 439—418 **20 Claims**

1. In a modular plug characterized by a unipartite rigid dielectric housing having a free end for insertion in a mating modular jack, a movable locking tab extending angularly rearwardly from the free end of the housing and adapted to mate with a tab-receiving latch in the modular jack, a cable input end for receiving a multi-conductor cable having an outer jacket, a terminal receiving side having plurality of slots for receiving substantially planar contact terminals having insulation-piercing tangs at the lower portion thereof for terminating the conductors of the cable and an upper portion for making electrical contact with the spring contact members of the mating modular jack, a cable receiving cavity defined by first and second substantially planar side walls and top and bottom walls, said cavity including a forward region that is insertable into the mating modular jack and a rear region that is not normally insertable into the mating modular jack, said cavity



including in the forward region thereof a plurality of conductor-receiving troughs.

the improvement which comprises first and second conductor-receiving grooves formed in the first and second side walls of the cavity of said housing, said grooves each extending longitudinally in said side walls and being substantially parallel to the conductor-receiving troughs;

said grooves each sized to receive one of the conductors of said multi-conductor cable, the number of conductors which can be received in the cavity being greater than the number of troughs formed in said housing.

4,874,331

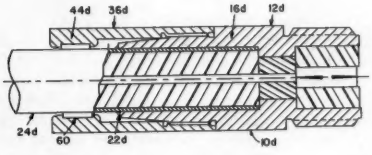
STRAIN RELIEF AND CONNECTOR - CABLE ASSEMBLY BEARING THE SAME

Ralph Iverson, Granada Hills, Calif., assignor to Whittaker Corporation, Los Angeles, Calif.

Filed May 9, 1988, Ser. No. 220,864

Int. Cl.[4] H01R *13/59*

U.S. Cl. 439—449 **3 Claims**



1. An improved electronic cable and connector assembly having a strain relief device, said assembly comprising, in combination:

(a) a metal-jacketed, semi-rigid, mineral-filled electronic cable,

(b) a metallic connector assembly, one end of which is connected to said cable, and,

(c) a hollow, generally tubular metal fitting with a central passageway extending longitudinally therethrough, an expanded end of said fitting being slip fitted over the exterior of said connector assembly adjacent to said one cable-connected end and enclosing the same, and extending over and enclosing the junction of said connector assembly and said cable, said connector assembly and said cable being joined at said junction by one of brazing and

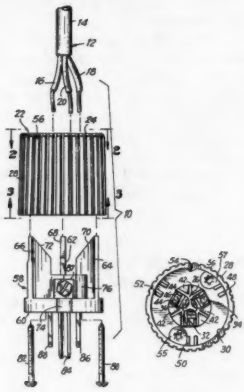
welding, said fitting also extending over and enclosing said cable to protect said junction against damage, said fitting having a reduced diameter opposite end with an extended lip of substantially uniform thickness enclosing, abutting and supporting said cable peripherally against strain at a point remote from said junction, said lip being lined with an elastomeric ring of extended surface area for high mechanical shock application.

4,874,332

ELECTRICAL PLUGS AND CONNECTORS WITH AUTOMATIC CORD CLAMPS

Ronald G. Munroe, Hallandale, Fla., assignor to Eagle Electric Manufacturing Co., Inc., Long Island City, N.Y.

Filed Mar. 6, 1989, Ser. No. 318,849
Int. Cl.[4] H01R *13/59*
U.S. Cl. 439—462 **12 Claims**



1. An electrical cord clamping device, comprising:

(a) an outer husk having a base wall bounding a hole through which an electrical wire is insertable along a longitudinal axis, and a generally cylindrical side wall extending longitudinally away from the base wall and bounding therewith an interior compartment, said base wall having a plurality of movable, inclined, locking legs unitary therewith spaced around the hole about said axis and extending into the compartment from the base wall and inclined relative to, and terminating short of, said axis;

(b) an inner main body insertable into the interior compartment along said axis to an assembled position of use, said main body having a support wall on which at least one electrical terminal for connection to the electrical wire is supprted, said support wall having a plurality of camming projections rigid with, and extending longitudinally away from, the support wall and spaced about said axis so that each such projection faces a respective said leg; and

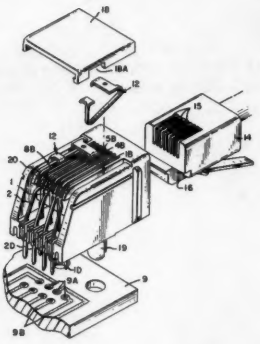
(c) locking means for longitudinally moving the main body into the interior compartment to the assembled position, and for longitudinally moving the projections against the legs to move all the legs toward said axis and circumferentially clamp the wire within, and resist removal of the wire from, the interior compartment.

4,874,333

SHUNTED MODULAR ELECTRICAL CONNECTOR

Carl G. Reed, Clemmons, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 8, 1985, Ser. No. 709,961
Int. Cl.[4] H01R *13/00*
U.S. Cl. 439—514 **12 Claims**



1. An electrical connector for use in interconnecting and disconnecting a plurality of separate conductors upon attachment to a mating electrical connector, the first electrical connector comprising:

a housing having a front mating face means including a cavity profiled for receiving the mating electrical connector,

a plurality of contact elements, each having first portions extending into the housing cavity and second portions fixed relative to the housing; and

at least one shunting element having fixed and moveable contact portions disposed in contact with separate laterally spaced contact element second portions fixed relative to the housing, and an intermediate portion connectable the fixed and movable contact portions, disposed in the housing cavity, movement of the intermediate portion upon insertion of the mating electrical connector into the housing cavity moving the movable contact portion to disrupt the connection between the separate contact elements.

4,874,334

ELECTRICAL OUTLET POSITIONER

Michael D. Golden, 429 Isabella Ter., Corona del Mar, Calif. 92625

Filed Oct. 18, 1988, Ser. No. 259,538
Int. Cl.[4] H01R *13/60*
U.S. Cl. 439—538 **6 Claims**

1. Positioner apparatus for a wall mounted electrical fixture comprising, in combination:

a conventional faceplate for a 110 volt outlet or switch;

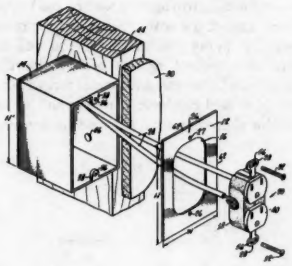
a flat rectangular plate having outside dimensions equal to that of the conventional faceplate, said flat rectangular plate comprising:

means defining an opening through said flat rectangular plate of sufficient size to enable a body of a conventional 110 volt outlet or switch to pass therethrough;

means defining aligning portions of the flat rectangular plate for both engaging ear portions of said conventional 110 volt outlet or switch and aligning the body of the conventional 110 volt outlet or switch in a perpendicular relationship with a wall despite the orientation of the electrical box with the wall and without intrusion of the flat rectangular plate into said electrical box or wall when said

conventional 110 volt outlet or switch is mounted to the electrical box; and

means for causing vertical alignment of the flat rectangular plate with the conventional faceplate and enabling horizontal alignment of the flat rectangular plate with the conventional faceplate when said conventional faceplate



is attached to the conventional 110 volt outlet or switch, said last mentioned means comprising means defining a pair of holes in a spaced apart relationship in said flat rectangular plate for enabling the mounting of said conventional outlet or switch to said electrical box by screws extending through the flat rectangular plate holes.

4,874,335

CABLE ASSEMBLY FOR MINERAL MINING INSTALLATIONS

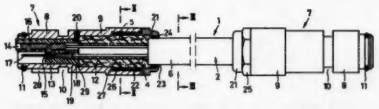
Willy Kussel, Werne, and Reiner Frank, Sprockhövel, both of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia GmbH, Lunen, Fed. Rep. of Germany

Filed Jun. 27, 1988, Ser. No. 212,378

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1987, 3721304

Int. Cl.[4] H01R *13/426*

U.S. Cl. 439—589 **5 Claims**



1. A multi-core electrical cable assembly for use in electro-hydraulic control systems for mineral mining installations; said cable assembly comprising:

a flexible cable (1) composed of a multi-layered sheath surrounding a plurality of electrical conductors (3); said sheath including an inner plastics insulation layer (4) snugly fitting around the conductors, a braided metallic armoured intermediate layer (5) surrounding the inner layer, and an outer plastics insulation layer (6) surrounding the intermediate layer; a connector (7) provided on one of the ends of the cable; said connector comprising a one-piece cylindrical component defining a plug portion (8) with an interior surface and an exterior surface for mating with a socket of a complementary connector, and a screw-threaded sleeve portion (9) having a stepped interior bore surface larger than the interior surface of the plug portion to provide a shoulder (19) therebetween; a plastics sealing body with a stepped exterior disposed within the stepped bore surface to lock within the sleeve portion, said sealing body serving to receive and bond-in an end region of said one end of the cable with the conductors of the cables extending through the sealing body, and the inner and intermediate layers of the cable extending substantially through the sealing body; a plastics carrier (13) with through bars (14, 15) containing electrical plug and socket forming contacts (16, 17) terminating the conductors within the plug portion; the carrier having a flange (18) which fits into the sleeve portion to lock the carrier in the connector and prevent withdrawal from the connector in a direction opposite to the cable;

releasable means (20) for restraining rotation of the contact carrier within the connector;

a screw-threaded locking ring (21) engaging within the sleeve portion, the screw-threaded ring having a flange (23);

a sealing ring (24) tightly surrounding the outer layer of the cable and abutting the flange of the locking ring to secure the cable exterior to the connector;

means (28) on the plug portion for locating the connector in the correct orientation with respect to the complementary connector; and

means (10) on the plug portion for cooperating with a releasable clamping device for detachably securing the connector to the complementary connector.

4,874,336

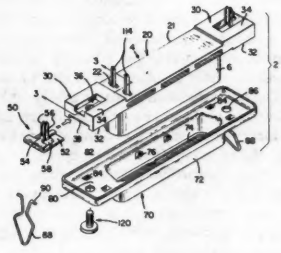
SHIELDED ELECTRICAL CONNECTOR FOR PRINTED CIRCUIT BOARD MOUNTING

Edward K. Marsh, Kernersville, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 15, 1988, Ser. No. 168,360

Int. Cl.[4] H01R *13/648*

U.S. Cl. 439—607 **2 Claims**



1. A shielded electrical connector of the type for mounting on printed circuit boards comprises:

an insulative housing having a flange means which supports the housing for mounting purposes and includes a shroud extending forwardly from the flange thereby defining a front mating face;

shielding means profiled for receipt over the shroud of the housing and over a front face of the flange means;

a retention member comprising a U-shaped clip portion received over an end of the flange means at each end of the housing, and including retention means extending from the clip portion for electrical connection to a grounding pad on a connectable printed circuit board, each U-shaped clip portion comprising a plate portion and a strap portion, where each plate portion comprises a hemisherically shaped threaded portion facing the strap portion and lying within a recess on the front face of the flange means, and each hemisherically shaped threaded member is lying within a hemisherically shaped portion of the recess, and the strap portion is lying within a further recess on a rear side of the flange, and the retention means extending from the strap portions; and

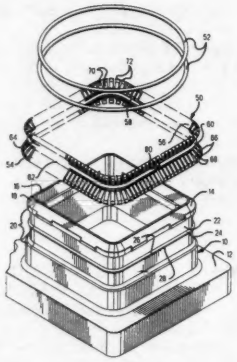
securement means, comprising threaded members cooperable with the threaded portions of the retention members and the shielding means to effect electrical contact between the retention members and the shielding means.

4,874,337

METHOD OF MOUNTING A REPLACEABLE EMI SPRING STRIP

Edward J. Paukovits, Jr., Hershey, and Susan E. Wright, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 23, 1988, Ser. No. 275,292
Int. Cl.[4] H01R *13/648*
U.S. Cl. 439—609 17 Claims



13. An assembly of an electrical connector conductive plug-like shell and a means therearound for providing conductive engagement with a mated electrical connector conductive receptacle-like shell therearound, comprising:

a conductive plug-like shell having a peripheral recess around the outer surface thereof rearwardly of a forward end thereof, a metal strip within said peripheral recess and around said shell, and elastomeric fastening means around said metal strip securing said metal strip to said shell, said metal shell having at least first spring fingers therealong extending outwardly from said recess and disposed and adapted to be engaged by a mating connector receptacle-like conductive shell and be deflected radially inwardly thereby toward said recess bottom, establishing grounding engagement with said mating shell;

said peripheral shell recess having a bottom surface defining a circumference, said recess bottom surface having forwardly and rearwardly facing stop surfaces spaced closely together and located approximately centrally of said peripheral recess;

said metal strip including a body section having a length approximately equal to said circumference, said metal strip having outwardly and inwardly facing major surfaces, said metal strip further including a plurality of said at least first spring fingers extending from said body section outwardly at an angle from said outwardly facing major surface and in one of a forwardly and rearwardly direction to free ends curved arcuately inwardly;

said metal strip further including on said body section a projection formed therealong extending outwardly from one of said outwardly and inwardly facing surfaces defining a corresponding groove extending into the other of said outwardly and inwardly facing surfaces and further defining forwardly and rearwardly facing surfaces corresponding respectively to said rearwardly and forwardly facing shell stop surfaces and adapted to fit thereagainst in stopping engagement upon said metal strip being disposed and secured within said peripheral shell recess;

said metal strip being disposed in and along said peripheral shell recess with said inwardly facing strip surface against said recess bottom surface and said corresponding said forwardly and rearwardly facing strip surfaces against said rearwardly and forwardly facing shell stop surfaces; and

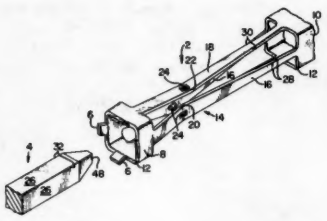
said elastomeric fastening means comprising at least one elastically deformable annulus having a circumference slightly less than said shell circumference along said recess bottom surface, securing said metal strip to said shell and against axial movement therealong by being stretched to hold said metal strip against said recess bottom surface and to hold said rearwardly facing strip surface against said forwardly facing shell stop surface and said forwardly facing strip surface against said rearwardly facing shell stop surface, whereby said metal strip is removable upon removal of said elastomeric means and a like metal strip is securable thereon with a like said elastomeric means facilitating repair.

4,874,338

RECEPTACLE BOX TERMINAL WITH IMPROVED CONTACT AREA

Johannes C. W. Bakermans, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 31, 1987, Ser. No. 32,899
Int. Cl.[4] H01R *11/22*
U.S. Cl. 439—851 10 Claims



1. A contact socket for receiving a contact pin comprising:

a pin receiving end and an inner end, the inside dimensions of the ends being greater than the dimensions of the pin;

an intermediate portion between the pin receiving end and the inner end having an even number of at least two similar beams which are integrally attached to the pin receiving end as well as the inner end, the beams being equally spaced around the axis of the socket;

each of the beams projects inward toward the axis of the socket such that a contact section is provided at an apex of each beam which is nearest the axis of the socket;

an embossment positioned on the apex of each beam, each embossment projects inwardly towards the axis of the socket, the embossments on each pair of opposed beams being aligned with respect to the axis of the socket, the minimum distance between the surface of the embossments being less than the width of the contact pin;

the associated pairs of beams having their embossments spaced from the pin receiving end; and

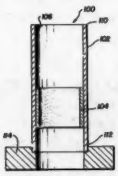
each embossment has a lead in surface integral therewith, the lead in surface cooperating with the pin to reduce the insertion force to prevent the pin from harming the embossment as the pin is inserted into the socket along the axis thereof.

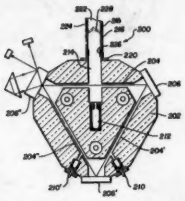
4,874,339

PUMPING TUBULATION GETTER

V. David Bratz, Colorado Springs, Colo., assignor to SAES Getters S.p.A., Milan, Italy

Filed Aug. 9, 1985, Ser. No. 764,134
Int. Cl.[4] H01J 9/00
U.S. Cl. 445—28 4 Claims





3. A method of manufacturing a ring laser gyroscope comprising the steps of:

(i) attaching one end of a pumping tubulation getter device to the outer wall of the ring laser gyroscope wherein the pumping tubulation getter device comprises:

(I) a hollow cylindrical tube of oxygen free high conductivity copper tubing adapted to be compression bonded by means of a pinch-off tool for the formation of the vacuum tight seal; and

(II) an electrophoretically deposited layer of porous sintered non-evaporable getter material selectively deposited on the internal surface of the hollow cylindrical tube leaving getter free zones at the ends of the hollow cylindrical tube;

wherein the getter material comprises:

A. a sintered particulate getter material selected from the group consisting of Zr and Ti the particles of which pass through a U.S. standard screen of 300 mesh/inch; and

B. an antisintering material selected from the group consisting of:

(a) a Zr—Al alloy comprising from 5 to 30 percent weight of aluminum balance zirconium; and
(b) a Zr—Ni alloy; and
(c) a Zr—Fe alloy; and
(d) a Zr—M_1—M_2 alloy in which M_1 is a metal selected from the group consisting of vanadium and niobium and M_2 is a metal selected from the group consisting of nickel and iron; and
(e) graphite; and
(f) tungsten; and
(g) molybdenum, and
(h) niobium; and
(i) tantalum; and

wherein the weight ratio A:B is from 19:1 to 2:3 and wherein said particles of zirconium-aluminum alloy are generally spaced out of contact with each other; and

(ii) evacuating the ring laser gyroscope via the hollow cylindrical tube; and

(iii) heating the ring laser gyroscope to a temperature of from 25° C. to 280° C. for a time of from 30 minutes to 5 days; and

(iv) activating the getter material by high frequency induction heating while air cooling the tube wall attachment area; and

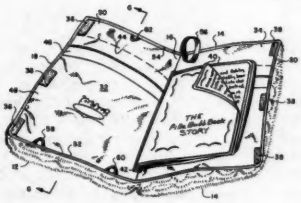
(v) compression bonding the second end of the getter device by means of a pinch-off tool to form a vacuum tight seal.

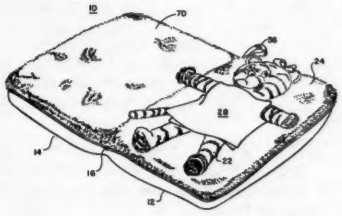
4,874,340

COMBINED AMUSEMENT DEVICE AND TRANSPORT AND STORAGE PACK

Alice R. Smallwood, 1517 Montclair Dr., Plano, Tex. 75075

Filed Jul. 21, 1988, Ser. No. 222,155
Int. Cl.[4] A63H 33/00; A47C 20/02; A45F 4/02; B42D 3/00
U.S. Cl. 446—28 16 Claims





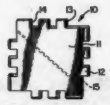
1. A combined amusement and storage device comprising:

first and second members joined together along a central portion of said device, each of said members having inner and outer major surfaces with a flexible material disposed therebetween, said members for being folded relative to one another such that the respective inner major surfaces of said members are substantially in facing contact and for being unfolded relative to one another to expose the respective inner major surfaces of said members;

each member having a first panel for overlapping a portion of the corresponding inner major surface to define a first pouch, a second panel for overlapping a portion of the first panel to define a second pouch and a third panel for overlapping a portion of the corresponding inner major surface which is not overlapped by the first panel and a portion of the first panel to conceal said first pouch; and

a three dimensional object attached to an outer major surface of the first member, such that when the first and second members are unfolded and their respective inner major surfaces positioned face down, the second member provides a cushioned headrest adjacent to the three dimensional object on the outer major surface of the first member.

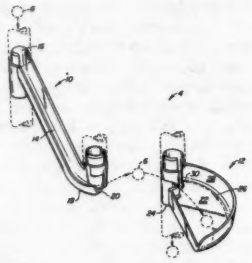
4,874,341
FOLDING POLYGONAL TOY CONSTRUCTION ELEMENT
James T. Ziegler, Toronto, Canada, assignor to Novation Design Ltd., Ontario, Canada
Filed Oct. 25, 1988, Ser. No. 261,924
Int. Cl.[4] A63H *33/08, 33/12, 33/00*
U.S. Cl. 446—109 **6 Claims**



1. A toy construction element in the form of a polygon comprising a substantially flat body portion having four or more edge faces of substantially equal length and top and bottom faces, each edge face having formed thereon a plurality of outwardly projecting integrally formed connectors adapted to connect with corresponding projecting connectors on an edge face of another construction element in a snap-together lateral interlock between adjacent elements while permitting hinging action between connected elements on an axis parallel to the connected edge faces,

wherein said construction element has at least one line of reduced thickness extending across the body of the element from apices of the polygon and through the center of the body of the element to form at least one living hinge which separates the body of the element into at least two equal triangular portions joined by at least one living hinge, the three sides of each triangular portion including at least one living hinge and at least one edge face.

4,874,342
JUMP CHUTE MARBLE RACE TOY
Daniel B. Klitsner, San Francisco, Calif., assignor to Discovery Toys, Inc., San Francisco, Calif.
Filed Jul. 1, 1988, Ser. No. 214,239
Int. Cl.[4] A63H *29/08*
U.S. Cl. 446—168 **8 Claims**



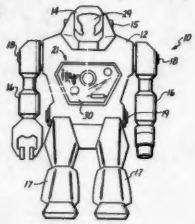
1. A toy for use with a marble race game in which the marble moves along a tortuous path comprising:

a chute having an entrance, a jump, and a downwardly extending speed track connecting the entrance and the jump;

a landing spaced from the jump and having a planar surface substantially larger than the width of the marble, an arcuate boundary projecting upwardly from said planar surface, and an exit positioned at a terminal end of said arcuate boundary and said planar surface; and

the chute configured and the landing positioned so that a marble enters the chute through the entrance, travels down the speed track, into the jump, out of the chute in a trajectory, lands at the landing and passes through the exit for traverse of the marble through the game.

4,874,343
TOY DETECTION AND SIGNALING CIRCUIT
Doren Rosenthal, Sal Luis Obispo, Calif., assignor to Mattel, Inc., Hawthorne, Calif.
Filed Oct. 23, 1987, Ser. No. 113,104
Int. Cl.[4] A63H *30/00, 33/22, 3/28*
U.S. Cl. 446—175 **9 Claims**



1. A toy for detecting and signaling changes in ambient light level comprising:

a toy figure assembly;

detection circuit means including a single photodetector responsive to ambient light and light reflected from moving objects to produce an electrical signal having lower frequency and higher frequency signal components and a comparator means having a frequency selective voltage divider network for causing said higher frequency signal component to be detected and said lower frequency signal component to be ignored whereby when said higher frequency signal component is of sufficient amplitude to exceed a predetermined bias voltage of said lower frequency signal component a change in output of said comparator means is produced; and

signaling means disposed in said toy figure assembly responsive to said comparator means for producing signals in response to changes in the output of said comparator means.

4,874,344
SOFT ANIMAL TOYS
John E. Kanter, 135 4th Street, Parkmore, Sandton, Transvaal, South Africa
Filed Jun. 29, 1988, Ser. No. 213,233
Claims priority, application South Africa, Jul. 2, 1987, 87/4806
Int. Cl.[4] A63H *3/00, 3/02;* **G09B** *23/28*
U.S. Cl. 446—268 **3 Claims**

1. A toy which of of soft construction and which comprises:

a parent fantasy animal toy;

a cavity in the abdomen of the parent fantasy animal toy;

a closable opening situated between the legs of the parent fantasy animal toy and leading into the cavity;

an infant fantasy animal toy located inside the cavity and distending the abdomen of the parent fantasy animal toy to give the parent fantasy animal toy the external appearance of being pregnant;

said infant fantasy animal toy having the appearance of an infant of the parent and being removable from the cavity

through the opening with the result that the parent fantasy animal toy reverts to an appearance of non-pregnancy;

a container for the parent fantasy animal toy having the appearance of a bed or sleeping bag and in which the

parent fantasy animal toy is locatable with its head protruding visibly from the container; and

straps attached to the container for enabling the container to be worn in the manner of a back-pack by a child.

4,874,345

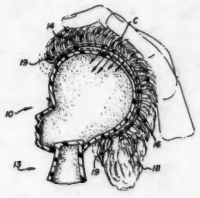
DOLL WITH CHANGEABLE HAIR PIECE

Clara Dirks, 1412 S. Quincy St., Arlington, Va. 22204

Filed Nov. 29, 1988, Ser. No. 277,652

Int. Cl.[4] A63H *3/44*

U.S. Cl. 446—394 **2 Claims**



1. A doll's head with changeable hair piece, comprising:

(a) a hair piece having front, rear sides and central portion and having a top side and an underside and having hair mounted only on the entire top side thereof from front to rear and from side to side and the central portion;

(b) a head including a convex crown portion having front, rear sides and a central portion and a face portion;

(c) said hair piece including a single stretchable, flexible, snap-fit concave suction cup having front, rear sides and central portion and having its front, rear sides and central portion coextensive with said front, rear sides and central portion of said top side and having a dimension substantially equal to said hair piece and said crown and forming when stretched and snapped onto said crown a vacuum above substantially the entire crown including said front, rear sides and central portion to resist efforts to remove said hair piece from said crown when said hair on said hair piece is grasped;

(d) said suction cup having a continuously curved central concavity cooperating with the continuous convexity of said head and including a peelable inwardly curved concave elastic peripheral edge of a greater curvature than the curvature of said curved central concavity of said cup and having its concavity continuous with the concavity of the cup so that said edge may be easily peeled back so as to break the suction between the cup and said crown to release said cup from said crown; and

(e) said suction cup having a normal dimension slightly less than said crown so that said cup when applied to said doll's head stretches outwardly over and against said entire crown to produce suction pressure over the entire crown front to rear sides and central portion.

4,874,346

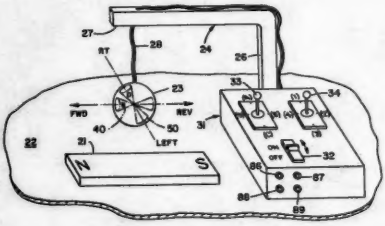
FREE FLYING MAGNETIC LEVITATOR

How Wachspress, P.O. Box 99141, San Francisco, Calif. 94109

Filed Jan. 6, 1988, Ser. No. 141,566

Int. Cl.[4] A63H *33/26*

U.S. Cl. 446—484 **13 Claims**



1. A free flying magnetic levitator adapted for disposition in an external surrounding dipole magnetic field having substantially parallel lines of force and comprising

at least a first pair of axially elongated toroidally wound magnet windings with each having a tapered configuration from a small diameter and to an outer large diameter end and said windings being disposed axially of each other with the small diameter ends contiguous to form a tripole magnet, and

means for controllably energizing said magnetic windings by current flowing between the small diameter ends and the large diameter ends to establish a magnetic field having like magnetic poles at the outer large diameter ends whereby the energized pair of magnet windings produce a tripole magnetic field having a dipole vector potential field generating forces of interaction with the external surrounding the dipole magnetic field for moving the levitator in the surrounding dipole magnetic field.

4,874,347

COIN SEPARATOR

Osamu Kobayashi, Tsurugashima; Koji Yukimoto, Sakado, and Mitsugu Mikami, Kawagoe, all of Japan, assignors to Kabushiki Kaisha Nippon Conlux, Tokyo, Japan

Filed Mar. 16, 1988, Ser. No. 169,246

Claims priority, application Japan, Mar. 23, 1987, 62-42293

Int. Cl.[4] G07D *3/02*

U.S. Cl. 453—5 **3 Claims**

1. A separator comprising:

a first coin passage through which a plurality of coins having different diameters are introduced in a substantially downward moving direction;

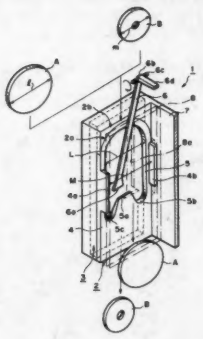
said first coin passage having a rear surface;

a second coin passage formed in part by a casing juxtaposed to the rear surface of said first coin passage so as to move selected coins in a substantially downward moving direction;

a plate disposed between and in part defining said first and second coin passages;

said plate being attached to and detachable from said casing;

an elongated hole formed in said plate and disposed lengthwise in the direction of downward coin movement, the diameter of said elongated hole being less than large diameter coins among a plurality of coins and greater than small diameter coins among a plurality of coins which move downwardly relative to said first coin passage, said



elongated hole being formed with arcuate cutouts on both sides of a lower upwardly projecting portion of said plate, said arcuate cutouts open in opposite upward relationship to the downward direction of coin movement, said upwardly projecting plate portion and a periphery of said arcuate cutouts tapering upwardly in cross-section so as to form an upwardly decreasing wall thickness; and

a tongue having a lower end adapted for entry into said elongated hole so as to allow the coins which have moved downwardly from the upstream side of said first coin passage to be urged toward said elongated hole with smaller diameter coins passing through said elongated hole into said second coin passage and large diameter coins moving said tongue out of said elongated hole to pass downwardly in said first coin passage.

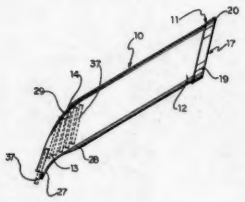
4,874,348

HANDLING DEVICE FOR COINS, TOKENS AND THE LIKE

Dennis R. Lafreniere, and Ronald E. McConnell, both of Swift Current, Canada, assignors to Dennis R. LaFreniere, Swift Current, Canada

Filed May 6, 1988, Ser. No. 191,230
Int. Cl.[4] G07D *1/00*
U.S. Cl. 453—50 **19 Claims**

1. A device for the loading, storing and selective dispensing of coins, tokens and the like comprising an elongated tubular holder portion having a lower side, loading means at one end thereof and selective dispensing means at the other end thereof, said selective dispensing means including a transversely situated dispensing slot adjacent the distal end of said other end and forwardly thereof and situated in a plane below said lower side of said tubular holder portion and including inclined chute means operatively connecting said slot with said other end of said tubular portion, said chute means including a substantially planar base portion inclining upwardly towards said lower side of said tubular holder portion and blending into said lower side with a smooth curve, said base portion extending at an obtuse angle from said lower side, the cross sectional configuration of the dispensing means increasing from said slot to the full diameter of said tubular holder portion whereby the orientation of a coin, token or the like changes from a position spanning said tubular holder portion in which the vertical plane of the coin, token or the like is at a rearwardly inclined



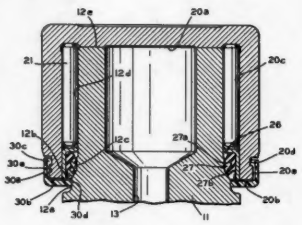
angle to the horizontal longitudinal axis of the tubular holder portion, to a planar position upon said base portion of said dispenser means and means to detachably retain said coin, token or the like upon said base portion until dispensed through said slot.

4,874,349

SEAL AND DUST GUARD ASSEMBLY FOR A UNIVERSAL JOINT TRUNNION

Ray A. Gall, Toledo, Ohio, assignor to Dana Corporation, Toledo, Ohio

Filed Dec. 7, 1987, Ser. No. 129,802
Int. Cl.[4] F16C *33/76*; F16D *3/41*
U.S. Cl. 464—14 **4 Claims**



1. A cross member for a universal joint comprising:

a body portion having a least one trunnion extending outwardly from said body portion, said trunnion including an outer friction surface extending outwardly from said body portion and an outer bearing surface extending outwardly from said friction surface;

a bearing cup having an open end an inner bearing surface, said bearing cup being disposed about said trunnion such that said inner bearing surface of said bearing cup is disposed co-axially about said outer bearing surface of said trunnion;

bearing means disposed between said inner bearing surface of said bearing cup and said outer bearing surface of said trunnion for permitting rotation of said bearing cup relative to said trunnion;

a seal assembly secure within said inner bearing surface of said bearing cup and adapted to sealingly engage said trunnion; and

a dust guard connected to said bearing cup including an axially extending portion and a radially extending portion, said radially extending portion extending adjacent to said open end of said bearing cup and terminating in an inner friction surface, said inner friction surface of said dust guard being frictionally engaged with said outer friction

surface of said trunnion to retain said bearing cup thereon, at least one groove being formed throughout an inner surface of said radially extending portion and said axially extending portion.

4,874,350

TORSIONAL DAMPER DEVICE COMPRISING TWO COAXIAL PARTS COOPERATING WITH CIRCUMFERENTIALLY ACTING SPRINGS

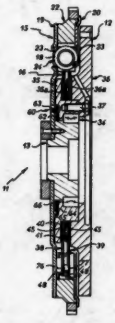
Pierre Casse, Ermont, and Gustave Chasseguet, Taverny, both of France, assignors to Valeo, Paris, France

Filed Aug. 19, 1987, Ser. No. 86,800

Claims priority, application France, Aug. 21, 1986, 86 11936

Int. Cl.[4] F16D *3/66, 7/02*

U.S. Cl. 464—68 **6 Claims**



1. Torsional damper device comprising coaxial first and second parts adapted to rotate relative to each other to a limited degree, two substantially parallel annular flanges and pivoted base members on said first part, two parallel plates on said second part disposed axially between said two flanges and having at least one pair of radial arms comprising parallel, substantially circumferential fingers, springs disposed substantially circumferentially between said base members, a surface on each base member opposite that in contact with the respective spring, rounded recesses in said surfaces in which said fingers engage on relative rotation between said two parts, rotational interlocking means for constraining said plates to rotate in unison together and adapted to establish a circumferential correspondence between said radial arms of said at least one pair and said fingers thereof, and said rotational interlocking means comprising at least one projection on one of said plates parallel to the common axis of said two parts and a corresponding hole in the other of said plates into which said projection is inserted.

4,874,351

CONTINUOUSLY VARIABLE BELT-DRIVE TRANSMISSION

Patrick Jackson, 240 Ayer Rd., Williamsville, N.Y. 14221

Filed Nov. 2, 1988, Ser. No. 266,165

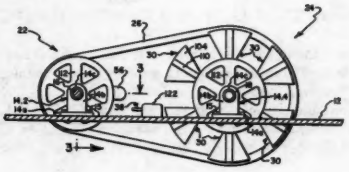
Int. Cl.[4] F16H *55/54*

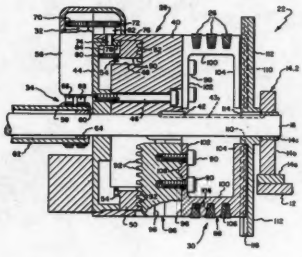
U.S. Cl. 474—49 **8 Claims**

1. A continuously variable belt drive transmission having a support; laterally spaced apart first and second shafts journalled for rotation on the support; first and second adjustable sheaves mounted on the first and second shafts, respectively, the sheaves being in parallel alignment with each other, each of the sheaves including a body secured to the associated shaft for rotation therewith and a plurality of sheave segments mounted on the body for radial inward and outward movement; and a power transmitting belt extending between the first and second sheaves;

characterized by

control means capable of selectively moving the segments radially inwardly or outwardly while the body is rotating with its associated shaft, the control means carried by the body of each of the first and second sheaves, the motor





means being operatively interconnected with the associated sheave segments and capable upon actuation of moving the sheave segments radially inwardly or outwardly, and power transmitting means extending to the motor means about a portion of each of said shafts from a source of power external of the transmission.

4,874,352

FLUIDIC TENSIONER

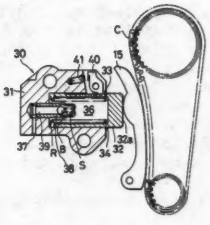
Tadasu Suzuki, Kawagoe, Japan, assignor to Tsubakimoto Chain Co., Japan

Filed Mar. 23, 1988, Ser. No. 172,314

Claims priority, application Japan, Aug. 6, 1987, 62-119784; Oct. 9, 1987, 62-154131

Int. Cl.[4] F16H *7/08*

U.S. Cl. 474—110 **2 Claims**



1. A hydraulic ball-type check valve tensioner having a plunger internally provided with a fluid chamber and slidably fitted in a housing in association with a spring biasing said plunger in a protruding direction, a passage formed in said housing communicating said chamber with and external source of fluid pressure, and a check ball mechanism provided between said housing and said chamber to permit fluid flow into

said chamber while blocking flow in the reverse direction, wherein the improvement comprises:

a rack formed on the outer surface of said plunger; and

a ratchet rotatably supported on said housing in meshing engagement with said rack and biased by a spring in a direction opposite to said protruding direction.

4,874,353

GROOVED PULLEY AND MANUFACTURING METHOD THEREFOR

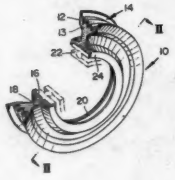
Ken Matsuoka, Toyohashi, and Masanobu Yamazaki, Kosai, both of Japan, assignors to Fuji Kiko Company, Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 865,462, May 21, 1986, Pat. No. 4,767,387, which is a continuation of Ser. No. 612,341, May 21, 1984, abandoned. This application Jan. 6, 1988, Ser. No. 141,226

Claims priority, application Japan, May 23, 1983, 58-90403; Apr. 13, 1984, 59-74525; Apr. 13, 1984, 59-74526

Int. Cl.[4] F16H *55/32*

U.S. Cl. 474—168 **7 Claims**



1. A pulley comprising:

a substantially flat, generally annular web having an inner and an outer peripheral edge; and

a cold rolled annular flange integrally formed on the outer peripheral edge of the web, the flange having a central section axially aligned with the web and two axially extending sections, each axially extending section extending axially beyond the web in a respective axial direction, the flange having a plurality of grooves, and the web and the flange comprising metal having continuous fiber-like metal grains extending from the web, through the center section of the flange and into a respective axially extending section of the flange.

4,874,354

METHOD AND APPARATUS FOR AUTOMATICALLY OPENING BAGS

Robert B. Johnson, Santa Clara, and Robert P. Smith, Santa Cruz, both of Calif., assignors to K & R Equipment, Incorporated, San Jose, Calif.

Division of Ser. No. 44,005, Apr. 29, 1987, Pat. No. 4,795,413. This application Oct. 11, 1988, Ser. No. 256,397

Int. Cl.[4] B31B *7/78, 7/80*

U.S. Cl. 493—101 **10 Claims**

1. An improved method for lining a container with flexible film bag-type liner, said container having an open top end and a bottom end positioned over a source of vacuum, said liner having a sealed end, an unsealed end, a first side, a second side, a first edge and a second edge, said method comprising the steps of:

suspending the unsealed end of the liner between at least two jaw assemblies and a like number of flexible tongues such that a first jaw assembly faces the first side of said liner, a second jaw assembly faces the second side of said liner, a first flexible tongue is mounted facing the second side of said liner opposite said first jaw assembly and a second flexible tongue is mounted facing the first side of said liner opposite said second jaw assembly, each said jaw assembly having a first jaw and a second jaws, said first jaw being movable away from said second jaw to open the jaws and being movable toward and into contact with said second jaw to close the jaws;

opening said jaws of each said jaw assemblies and moving said jaw assemblies and said tongues toward said liner until the tongues contact the sides of the liner and push both sides of the liner between the open jaws of the jaw assembly mounted opposite;

closing the jaws;

moving the jaw assemblies and the flexible tongues apart, such that each jaw assembly retains only the side of the liner with which it is in direct contact, to separate said sides of said liner and open the unsealed end;

directing a stream of air into the opened, unsealed end of the liner to further separate the sides of the liner;

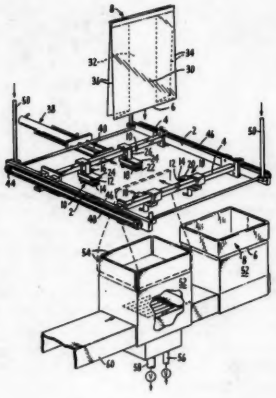
moving the jaw assemblies holding the open end of said liner over the open top end of the container to be liner;

actuating the source of vacuum of invert said liner, drawing said sealed end of said liner into said bottom end of said container; and,

opening the jaws and moving the jaw assemblies away from the lined container.

5. An apparatus for lining containers with a flexible film liner having a first side, a second side, a first edge, a second edge, a sealed end and an unsealed end, said apparatus comprising:

a means for suspending the liner such that the unsealed end is down;



a liner opener having at least two jaw assemblies mounted on the first side of the liner at the unsealed end, one such jaw assembly being mounted at about the first edge and one such jaw assembly being mounted at about the second edge, and an identical number of jaw assemblies mounted on the second side of the liner facing the jaw assemblies mounted on the first side, and, a means for slidably moving the jaw assemblies mounted on the first side of the liner towards and into contact with and away from the jaw assemblies mounted on the second side of the liner, each jaw assembly comprising a first jaw and a second jaw, each of said jaws having a gripping surface, a flexible tongue which extends beyond the first and second jaw, and a means for moving the first and second jaw with respect to each other such that when the gripping surface of the first jaw is spaced away from the gripping surface of the second jaw the jaws are in an open position, and such that when the gripping surface of the first jaw is in contact with and exerts pressure against the gripping surface of the second jaw the jaws are in a closed position, the jaw assemblies on the first side of the liner being mounted for relative movement towards and away from the jaw assemblies on the second side of the liner such that when the jaw

assemblies on the first side are slidably moved toward the jaw assemblies on the second side, the jaws of each jaw assembly move to said open position and the tongues of the jaw assemblies on the first side push both sides of the liner between the gripping surfaces of the jaws of the jaw assemblies on the second side and the tongues of the jaw assemblies on the second side push both sides of the liner between the gripping surfaces of the jaws of the jaw assemblies of the first side thus allowing the jaw assemblies of the first side to grasp and hold the first side of the unsealed end of the liner and the jaw assemblies on the second side to grasp and hold the second side of the unsealed end of the liner when the jaws are moved to said closed position and the jaw assemblies on the first side are moved away from the jaw assemblies on the second side, for spreading open the unsealed end of the liner;

an air blower for directing air into the opened, unsealed end of the liner;

a means for moving the liner opener down over a container having an open container top and an air permeable container bottom, such that after the liner has been opened and air has been directed into the opened, unsealed end of the liner, the open end of the liner can be placed over the open container top; and,

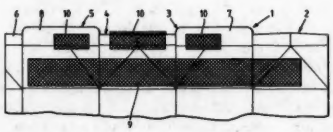
a means for applying a vacuum to the air permeable bottom of the container to draw the sealed end of the liner into the container.

4,874,355

METHOD IN THE PRODUCTION OF A CONTAINER, OR A CONTAINER BLANK, RESPECTIVELY, AND A DEVICE FOR USE WITH SAID METHOD

Knut O. Nesse, Terneuzen, Netherlands, assignor to Elopak Systems AG, Glattbrugg, Switzerland

Filed Mar. 29, 1988, Ser. No. 174,869
Claims priority, application Norway, Apr. 6, 1987, 871430
Int. Cl.[4] B31B *3/74*
U.S. Cl. 493—148 **5 Claims**



1. A method of producing a container of the type where the container is to be filled with a product that may foam during filling or sealing comprising:

(a) providing a blank cardboard material coated with an impregnated layer suitable for the product to be contained and with the blank having a sealing zone for forming a sealed closure upon forming the blank into a container and another zone adjacent to but spaced from said sealing zone so that, when the blank is formed into a container, said another zone will be located interiorly with respect to said sealing zone,

(b) applying an antifoam medium in the form of a narrow strip to said another zone spaced from said sealing zone by means of roll with said medium containing a composition not soluble in water and having a molecular weight of between 400–10,000 with at least 40% by weight consisting of alkylene oxy groups with 2-4 carbon atoms and of which at least 60% consist of alkylene oxy groups with 3-4 carbon atoms, and

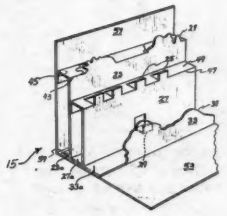
(c) shaping the blank into a container so that upon filling, any foam generated will first contact said another zone prior to contacting said sealing zone.

4,874,356

METHOD OF MAKING A PIECE CONTAINING MULTIPLE POP-UPS

John K. Volkert, Northfield, Ill., assignor to One Up, Inc., Northfield, Ill.

Filed Jul. 10, 1987, Ser. No. 72,338
Int. Cl.[4] B05C *1/00*
U.S. Cl. 493—335 **18 Claims**



1. A method of making a promotional piece having multiple interconnected pop-ups, which method comprises

die-cutting a continuous web of printed sheet material to create a series of successive blanks each of which includes a plurality of pop-up panels associated with a pair of basepieces and is arranged to extend transversely across the width of said web,

applying a plurality of glue lines to each of said blanks of said web,

cutting said web longitudinally into at least three continuous ribbons, a first ribbon containing a first pop-up panel, a second ribbon containing a second pop-up panel, and a third ribbon containing said basepieces,

folding said first ribbon upon itself along a line extending longitudinally of said web,

locating said folded first ribbon and said second ribbon in superimposed positions upon said third ribbon so that there is attachment of at least one of said pop-up panels to at least one of said basepieces via at least one of said glue lines,

folding said third ribbon upon itself along a line extending longitudinally of said web so as to sandwich said first and second ribbons therebetween with adjacent ribbons interconnected to each other by said glue lines, and

transversely cutting said continuous web to form a plurality of identical promotional pieces having interconnected pop-ups.

4,874,357

CENTRIFUGAL FLOTATION APPARATUS

Thomas P. Campbell, 1145 Lakeshore Dr., Coos Bay, Oreg. 97420

Filed Mar. 27, 1989, Ser. No. 329,294
Int. Cl.[4] B04B *11/00*
U.S. Cl. 494—26 **11 Claims**

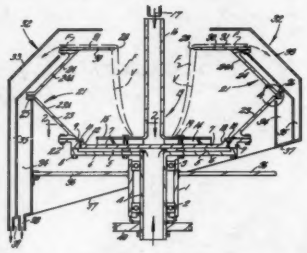
1. A centrifugal apparatus for separating by flotation mineral or metallic particles from a slurry, said apparatus comprising,

a base,

impellor means for dispersing the slurry about the impellor axis,

a bowl assembly about said impellor means and into which the slurry is discharged by the impellor means, drive means for said bowl assembly, bubble generating means discharging streams of bubbles, conduit means in communication with a source of air to provide an air flow to bubble generating means, an inclined surface outwardly of the impellor means and against which slurry impinges prior to mergence with the bubble streams generated by

the bubble generating means, a first bowl outlet, a second bowl outlet offset from said first outlet, and



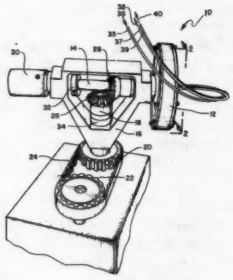
collector means disposed about said bowl assembly and defining chambers for the separate collection of material from the first and second outlets.

4,874,358

DUAL AXIS CONTINUOUS FLOW CENTRIFUGATION APPARATUS AND METHOD

Owen D. Brimhall, West Valley City; Stephen C. Peterson, Salt Lake City; Oleg Kotlyar, Salt Lake City, and Dilip N. Ghosh Roy, Salt Lake City, all of Utah, assignors to Utah Bioresearch, Inc., Salt Lake City, Utah

Filed Feb. 1, 1989, Ser. No. 305,528
Int. Cl.[4] B04B *5/00, 9/00*
U.S. Cl. 494—37 **12 Claims**



10. A method for providing faster separation of components in a liquid medium during continuous flow centrifugation comprising:

preparing a centrifuge head having a flat, circular inlet chamber, an angled centrifuge chamber at the outer periphery of the inlet chamber, the centrifuge chamber having a relatively thin cross section and being configured as a truncated surface of a right circular cone having an outer periphery and an inner periphery with the inlet chamber interconnecting to the centrifuge chamber adjacent the midsection of the centrifuge chamber, a red blood cell chamber in fluid communication with the outer periphery of the centrifuge chamber, and a plasma chamber in fluid communication with the inner periphery of the inner periphery of the centrifuge chamber;

mounting a flexible, plasma conduit to the centrifuge head in fluid communication with the plasma chamber, and a flexible, red blood cell conduit to the centrifuge head in fluid communication with the red blood cell chamber;

securing the centrifuge head to a rotatable, horizontal axle; and

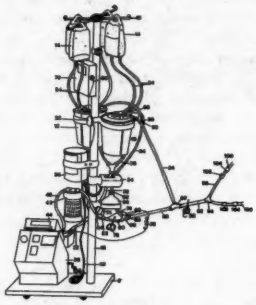
rotating the horizontal axle in an horizontal plane while turning the horizontal axle to rotate the centrifuge head in a vertical orientation while matching each rotation of the centrifuge head with each rotation of the horizontal axle in the horizontal plane thereby precluding twisting of the whole blood, plasma, and red blood cell conduits.

4,874,359

POWER INFUSER

Frederick R. White, 3656 Glazier Way, Ann Arbor, Mich. 48105, and Roy E. Bolles, 50 Woodland Dr., Iowa City, Iowa 52240

Filed Dec. 14, 1987, Ser. No. 132,967
Int. Cl.[4] A61M *37/00*
U.S. Cl. 604—4 **22 Claims**



1. A power infuser comprising at least one cardiotomy reservoir and means to charge the reservoir with fluid, fluid conduit means providing a recirculatory loop communicating from and returning to the reservoir, an air embolus sensor in a near downstream location relative to the reservoir in the loop, a non-fluid contact pump in the loop downstream of the air embolus sensor, means to control the temperature of the fluid in the loop, a bubble trap-filter in a far downstream location relative to the reservoir in the loop said bubble trap-filter having an inlet and outlet, said fluid conduit means including tubing means in fluid communication with the filter outlet at one end and with the reservoir at a second end to complete the recirculatory loop, and separate means in fluid communication with the tubing means between the bubble-trap filter outlet and reservoir to selectably discharge fluid from the loop to a patient, said discharge means being downstream of the bubble trap-filter.

4,874,360

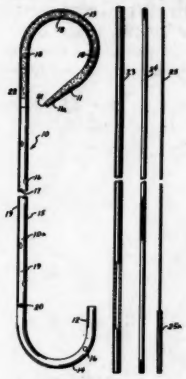
URETERAL STENT SYSTEM

Jay R. Goldberg, Northbrook, Ill., and Donald V. Hillegass, Franksville, Wis., assignors to Medical Engineering Corporation, Racine, Wis.

Filed Jul. 1, 1988, Ser. No. 214,180
Int. Cl.[4] A61M *25/00*
U.S. Cl. 604—8 **1 Claim**

1. In a ureteral stent comprising an elongated member having a soft, flexible main body with a first hook at one end for placement in the bladder of a patient and a second hook at the other end for placement in the patient's kidney, the improvement which comprises forming said stent of a homogeneous, essentially linear, segmented aliphatic polyurethane elastomer composed of three repeating units, a diol, a diisocyanate and a macroglycol, the main body and first hook of said stent having a durometer of about 50 to about 80 Shore "A" and the second

hook having a durometer of about 95 Shore "A" and a good memory that enables it to quickly resume its hook shape at



body temperature when a hook straightening force has been removed.

4,874,361

METHOD FOR HEALING DAMAGED SKIN

Zein E. Obagi, 200 Surry Dr., Bonita, Calif. 92002

Filed Dec. 29, 1986, Ser. No. 947,085

Int. Cl.[4] A61N *1/30*

U.S. Cl. 604—20 **16 Claims**

1. A method of treating damaged areas of skin comprising the steps of:

applying to said damaged area a therapeutically effective amount of a composition comprising trichloroacetic acid, a surfactant having growth stimulatory activity, and an emulsifier; and

irradiating said area of damaged skin in contact with said composition for a time sufficient to induce peeling of said damaged area.

4,874,362

METHOD AND DEVICE FOR INSUFFLATING GAS

Peter P. Wiest, Hessenallee 8, 1000 Berlin 19, and Hubert Fuchs, Grunewaldstr. 13, 1000 Berlin 41, both of Fed. Rep. of Germany

Filed Mar. 27, 1987, Ser. No. 32,005

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1986, 3611018

Int. Cl.[4] A61M *13/00*

U.S. Cl. 604—26 **5 Claims**

1. A device for controlling the admission of insufflating gas in to a body cavity through an inflow needle, particularly for laparoscopy comprising:

a pressure gas line;

a pressure reducer means connected to said gas line for supplying gas at a pressure reducer exit pressure, which is a working pressure to the needle;

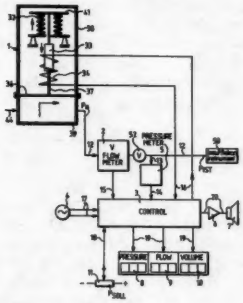
a pressure meter connected to said gas line downstream of said pressure reducer means and means for outputting a signal representative of gas pressure in said gas line;

a flow meter connected to said gas line downstream of said pressure reducer means and means for outputting a signal representative of gas flow in said gas line;

a clock pulse generator means for providing a timed pulse;

a nominal pressure generator means for maintainning a preset nominal pressure; and,

control means operatively connected to said pressure reducer means via a pressure a reducer means control line, connected to said pressure meter via a pressure meter line for receiving a signal representative of gas pressure in said gas line, connected to said flow meter via a flow meter line for receiving a signal representative of gas flow in said gas line, connected to said pulse generator means for receiving a continuous timed pulse signal and connected to said nominal pressure generator means via a pressure generator means control line, said control means being for varying the working pressure as a function of said timed pulse signal by repeatedly, at successive clock pulses, controlling said pressure reducer means to reach a preset nominal gas line pressure in said pressure gas line in response to a signal from said nominal pressure generator means and for repeatedly operating said flow meter to detect the gas



flow rate through said flow line, comparing at successive clock pulses, the gas flow rate detected by the flow meter at the preset nominal gas pressure to a preset flow rate value and regulating the pressure reducer exit pressure to a maximum pressure value of 50 mm Hg, higher than the nominal pressure set by the nominal pressure generator means and back to the preset nominal gas pressure for subsequent comparisons if the flow meter indicates a flow rate exceeding the preset flow rate value until the flow rate falls to the preset value, and regulating the pressure reducer means to an exit pressure equal to the preset nominal pressure value, if the flow measured by said flow meter at said preset nominal gas pressure is less than the preset flow rate value.

4,874,363

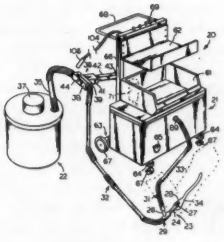
COLON HYDROTHERAPY AND EVACUATOR SYSTEM

Walter L. Abell, 2773 Spaulding Dr., Dunwoody, Ga. 30338

Continuation-in-part of Ser. No. 889,228, Jul. 25, 1986, abandoned. This application Jul. 23, 1987, Ser. No. 77,734

Int. Cl.[4] A61M *1/00*

U.S. Cl. 604—28 **12 Claims**



12. A method for clearing a blockage from a speculum of the type having a tubular body defining a single longitudinal pas-

sageway therethrough, a tapered end with opposing nozzle openings in communication with said passageway for insertion into the colon of a patient and a discharge end having discharge and liquid inlet openings in communication with said passageway for positioning outside the anal canal comprising the steps of:

selecting a flow rate for moving liquid through the liquid inlet opening;

moving liquid through the liquid inlet opening while preventing the flow of liquid through the discharge opening;

discontinuing the movement of liquid through the liquid inlet opening while allowing the flow of liquid through the discharge opening; and

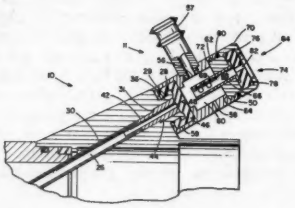
repeating the steps of moving liquid through the liquid inlet opening and discontinuing the movement of liquid through the liquid inlet opening in a rapid, alternating manner to generate a pulsating flow of liquid through the nozzle openings to break up the blocking material so that it can flow through said longitudinal passageway and out the discharge opening.

4,874,364

INSPECTION INSTRUMENT CHANNEL ASPIRATOR AND PRESSURE NEUTRALIZING DEVICE

David L. Morris, Melton-Mobray, England; Mihail Filip, Shelton, Conn.; Frank D. D'Amelio, Oxford, Conn.; Dominick G. Esposito, Danbury, Conn., and Robert H. Quint, Jamaica, N.Y., assignors to Circon Corporation, Santa Barbara, Calif.

Filed Mar. 22, 1988, Ser. No. 171,569
Int. Cl.[4] A61M *1/00*
U.S. Cl. 604—35 **22 Claims**



1. A pressure neutralizing device for use with a working channel of an inspection instrument, the device comprising:

frame means having a first aperture means, a second aperture means and a chamber means therebetween for passage of a working instrument therethrough, said first aperture means being positionable proximate a working channel of an inspection instrument for communication therewith;

first pressure buffer means positioned at said first aperture means for providing a buffer between a working channel of an inspection instrument and said chamber means of the device, said first pressure buffer means being adapted to pass a working instrument therethrough;

second pressure buffer means positioned at said second aperture means for providing a buffer between said chamber means and a working inlet of the device, said second pressure buffer means being adapted to pass a working instrument therethrough; and

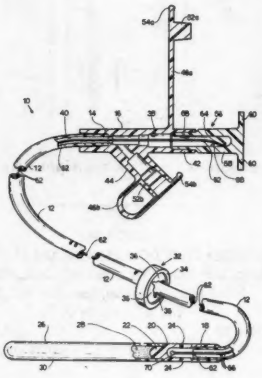
means operably coupled to said chamber means for reducing the pressure between said first and second buffer means whereby material passing through said first buffer means into said chamber means from a working channel of an inspection instrument can be substantially prevented from exiting through said working inlet at the pressure or an elevated velocity.

4,874,365

FEEDING TUBE FACILITATING IMPROVED PLACEMENT AND PERMITTING SUBSEQUENT DELIVERY OF A SECOND PRESCRIBED PRODUCT AND METHOD THEREFOR

Warren P. Frederick, Wonder Lake; Sarah L. Steele, Evanston; David D. Rhodes, Palatine, and Christopher L. Arns, Lake Bluff, all of Ill., assignors to Baxter International Inc., Deerfield, Ill.

Filed Oct. 11, 1984, Ser. No. 659,809
Int. Cl.[4] A61M *25/00*
U.S. Cl. 604—54 **4 Claims**



1. A naso-gastric feeding tube comprising:

(A) a flexible, hollow tube having an open proximal end and a distal end;

(B) a discharge aperture defined near said distal end, in communication with the interior of said hollow tube;

(C) a hollow adapter permanently mounted on said open proximal end, the interior of said adapter being in open communication with the interior of the hollow tube, said adapter further including a stylet port and a placement port;

(D) at least one of said stylet port and said placement port including closure means associated therewith for closing said one port;

(E) a stylet including:

(i) a stylet plug removably mounted in said stylet port, and

(ii) a stylet wire permanently mounted at its proximal end to said stylet plug and extending substantially the entire length of said hollow tube, within said hollow tube;

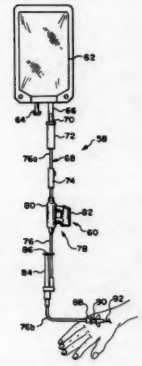
(F) the maximum exterior diameter of said stylet wire being sufficiently less than the interior diameter of said hollow tube, so that said placement port is in open fluid communication with said discharge aperture so that fluid may be withdrawn through said discharge aperture through said placement port while said stylet wire is in said tube; and

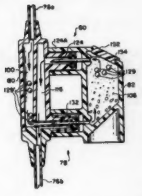
(G) said stylet port and said placement port having means for simultaneously receiving separate products for discharge through said discharge aperture when said stylet is removed from said tube.

4,874,366
HOUSING ENABLING PASSIVE MIXING OF A BENEFICIAL AGENT WITH A DILUENT

Brian Zdeb, Round Lake Park; Steve Pearson, and Glenn L. Slater, both of Ingleside, all of Ill., assignors to Baxter International Inc., Deerfield, Ill.

Continuation of Ser. No. 154,523, Feb. 7, 1988, abandoned, which is a continuation of Ser. No. 721,991, Dec. 3, 1984, abandoned. This application Dec. 19, 1988, Ser. No. 287,504
Int. Cl.[4] A61M 5/00
U.S. Cl. 604—56 41 Claims





1. A housing means adapted for insertion in an intravenous delivery system including a fluid source and a fluid conduit, wherein fluid is delivered from the fluid source through the fluid conduit to the intravenous system of a patient, the housing means being adapted for receiving a beneficial agent to be mixed with fluid flowing through the fluid conduit, said housing means comprising:

(a) a receptacle adapted for insertion into the fluid conduit and including inlet means adapted for connection to an upstream portion of the fluid conduit and outlet means adapted for connection to a downstream portion of the fluid conduit;

(b) a separate cartridge including a chamber, selectively secured to said receptacle, said chamber adapted for receiving the beneficial agent, said chamber including an upstream end adapted for fluid communication with said inlet means, said chamber further including a downstream end;

(c) a discharge segment disposed in both said cartridge and said receptacle when said cartridge is secured to said receptacle, including a discharge segment upstream and adapted for communication with said chamber downstream end, and a discharge segment downstream end in communication with said outlet means;

(d) connecting means in both said receptacle and said cartridge for securing said cartridge to said receptacle;

(e) whereby when said cartridge is not secured to said receptacle, liquid from the fluid source may still be delivered to the patient through the fluid conduit, including said receptacle, with no liquid leaving said receptacle between said receptacle inlet means and said receptacle outlet means;

(f) whereby, when said chamber is in fluid communication with said receptacle and said discharge segment, virtually all liquid which flows out said outlet means flows through all three of said inlet means, said chamber and said discharge segment, forming a fluid pathway in said housing; and

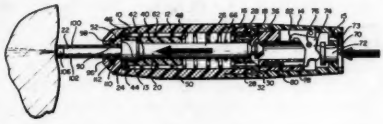
(g) further whereby said chamber downstream end is disposed at an elevation higher than said chamber upstream end, so that the direction of liquid flow through at least a portion of said chamber is in a generally upward direction, generally opposite to the direction of liquid flow from the fluid source to the patient;

(h) such that as fluid flows through said housing, the beneficial agent in said chamber mixes with the liquid and is delivered therewith to the patient.

4,874,367
HYPODERMIC JET INJECTOR AND CARTRIDGE THEREFOR

Bryant Edwards, Clarendon Hills, Ill., assignor to Marpam International, Inc., Clarendon Hills, Ill.

Filed Feb. 5, 1988, Ser. No. 152,467
Int. Cl.[4] A61M 5/30
U.S. Cl. 604—72 6 Claims



1. A hypodermic jet injector comprising a gun and a medicament containing cartridge; said gun comprising:

an elongated hollow body having an opening in one end;

piston means positioned in said elongated body to move axially and longitudinally within said elongated body, spring means urging one end of said piston means toward said opening, trigger means adapted to releasably hold said piston means away from said opening in opposition to the urging of said spring means, a plunger affixed to the one end of said piston means and extending through said opening in said one end of said elongated body;

cartridge engaging means affixed to said one end of said elongated body, said cartridge engaging means comprising a shoulder and a slot, said shoulder connected to the exterior of said elongated body adjacent to said opening in said one end of said elongated body, said slot positioned between said shoulder and said body, transverse to the axis of said elongated body;

said cartridge comprising:

an elongated tube having a closed end and an open end, an orifice positioned in said closed end, a plug slidably positioned in the open end of said tube and a medicament in the space defined by said tube and said plug;

an interrupted flange affixed to said tube adjacent to said open end, said flange extending transverse to the axis of said tube;

a collar extending longitudinally from said tube and beyond said interrupted flange, at said open end, of said tube;

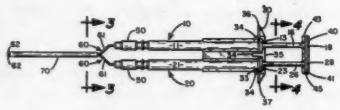
said cartridge removably locked onto said gun by inserting said collar into the opening in said one end of the elongated body of said gun with the interruption in said flange passing over said shoulder, said collar surrounding said plunger, and rotating said cartridge, whereby said interrupted flange engages the slot in said shoulder and thereby locks said cartridge to said gun to maintain said cartridge in said locked position when said trigger means releases said piston means and said spring means urges said piston means toward said opening.

4,874,368

FIBRIN GLUE DELIVERY SYSTEM

Curtis H. Miller, Burnsville, Minn.; I. Kaufman Arenberg, and John H. Altshuler, both of Englewood, Colo., assignors to Micromedics, Inc., St. Paul, Minn.

Filed Jul. 25, 1988, Ser. No. 224,078
Int. Cl.[4] A61M *5/08*
U.S. Cl. 604—82 3 Claims



1. A delivery system for applying to a treatment site a tissue adhesive having a pair of components which must be kept separate from each other until they reach the treatment site, said delivery system comprised of:

(a) a first syringe body for storing a first tissue adhesive component and a second dyringe body for separately storing a second tissue adhesive component;

(b) a separate piston type plunger, having an elongated shaft, a head and a push flange, associated with each of said syringe bodies for expelling from each of said syringe bodies its associated tissue component;

(c) a hypodermic needle, having an elongated portion, associated with each of said syringe bodies;

(d) means for connecting said syringe bodies to said hypodermic needles so that each of said tissue adhesive components is afforded an independent flow path from its syringe body, through said connecting means and through its hypodermic needle preventing the comingling of said first and second tissue adhesive components before they reach the treatment site;

(e) a hollow sleeve surrounding the elongated portions of said hypocermic needles retaining said elongated portions in parallel registration with respect to each other and forming a structure which permits the needles to be bent simultaneously into a desired shape; and

(f) means for retaining said syringe bodies in parallel alignment.

4,874,369

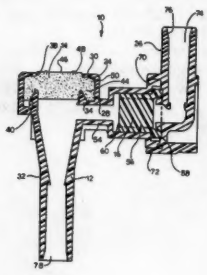
SELF-PRIMING INJECTION SITE WITH CHECK VALVE

Lee Kulle, Mundelein; Vince Desecki, Ingleside, and John M Hess, III, Cary, all of Ill., assignors to Baxter International Inc., Deerfield, Ill.

Filed Jul. 27, 1987, Ser. No. 78,485
Int. Cl.[4] A61M *37/00*
U.S. Cl. 604—86 27 Claims

1. An injection site for use in an apparatus for administering a parenteral solution to a patient, said injection site comprising:

a stopper housing including a top with a center opening, a cylindrical portion having an O-shaped ledge positioned therein, said O-shaped ledge having a lip turn towards said top, and a cone-shaped outlet portion integral with the cylindrical portion and extending away from the top; and



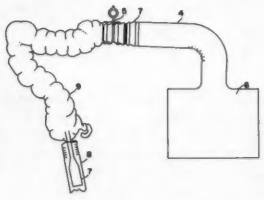
a disc-shaped stopper positioned in said center opening between the top and the ledge of the cylindrical portion.

4,874,370

ADAPTER DEVICE FOR IRRIGATING THE INTESTINE

Albert Heimerl, Ammersbek; Hans-Adolf Brammer, Buchholz, and Wolfgang Hofeditz, Hamburg, all of Fed. Rep. of Germany, assignors to Beiersdorf Aktiengesellschaft, Hamburg, Fed. Rep. of Germany

Continuation of Ser. No. 932,966, Nov. 20, 1986, abandoned.
This application Mar. 9, 1988, Ser. No. 165,877
Claims priority, application Fed. Rep. of Germany, Nov. 30, 1985, 8533814
Int. Cl.[4] A61M *11/00*
U.S. Cl. 604—93 9 Claims



1. In combination, for irrigating the intestines during surgery, an irrigating cannula for connection to the intestines at one location, a conical apapter for connection to the intestines at a second location, the adapter having one or more trimming guides in the form of scores, means for securing the intestines to said adapter, and a hose connected to the adapter, whereby when said cannula, adapter, hose and securing means are in working positions an irrigating liquid can be introduced throught the cannula and withdrawn through the hose.

4,874,371

CONTROL HANDLE

Richard H. Comben, Minneapolis; Byron L. Gilman, Plymouth, and Leonid Shturman, Minnetonka, all of Minn., assignors to Medilase, Inc., Minneapolis, Minn.

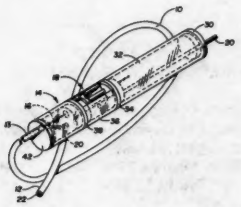
Filed Nov. 5, 1987, Ser. No. 117,479
Int. Cl.[4] A61B *1/00*
U.S. Cl. 604—95 22 Claims

1. A control handle comprising:

a body having a longitudinal axis;

a rotatable control wheel having a center axis about which the wheel is attached to the body;

elongated torque transmitting means extending through the body along an axis coincident with the center axis of the control wheel, off-axis from the longitudinal axis of said body and attached to the control wheel such that rotating



the control wheel in a direction substantially perpendicular to the axis rotates the torque means about said center axis over its entire length; and

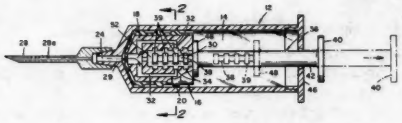
working means remote from the body attached to the torque means for rotation therewith.

4,874,372

NON-REUSABLE SYRINGE

William McArthur, 23041 LaGranja Dr., Valencia, Calif. 91354, and Thomas M. Soukup, 4722 Karling Pl., Palmdale, Calif. 93550

Filed Sep. 27, 1988, Ser. No. 251,201
Int. Cl.[4] A61M 5/00
U.S. Cl. 604—110 13 Claims



1. Non-reusable syringe for drawing fluid from a fluid source comprising:

(a) a body having a fluid chamber and a fluid inlet in communication with said fluid chamber;

(b) plunger means reciprocally movable within said fluid chamber from a first position to a second position to draw fluid from the fluid source through said fluid inlet toward said fluid chamber, said plunger means comprising a plunger sealably movable within said fluid chamber, said plunger having an internal chamber and a fluid passageway interconnecting said internal chamber with said fluid inlet of said body;

(c) a plunger handle for moving said plunger between said first and second positions; and

(d) connector means for interconnecting said plunger handle and said plunger means for permitting only one time movement of said plunger means from said first position to said second position.

4,874,373

DIP FORMED CATHETER AND ASSEMBLY

Ronald B. Luther, 530 Kings Rd., Newport Beach, Calif. 92663, and Billy H. Hannaford, 1822½ Newport Blvd., #372, Costa Mesa, Calif. 92627

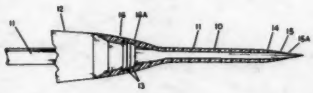
Filed Mar. 3, 1987, Ser. No. 21,135
Int. Cl.[4] A61M 5/18
U.S. Cl. 604—164 21 Claims

1. A catheter and needle assembly formed by a process of:

a. dip coating a mandrel from a solution of an expandable, hydrophilic polymer;

b. expanding the polymer coating away from the mandrel by contacting the polymer with a liquid containing water;

c. removing the polymer coating in the form of a catheter from the mandrel, the catheter defining a longitudinal cavity approximating the shape of the mandrel; and,



d. inserting a needle into the longitudinal cavity of the catheter and drying the catheter to contract the catheter about the needle;

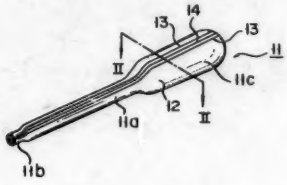
the catheter being expandable due to contact with a liquid containing water, and thereby being removable from the needle.

4,874,374

MEDICAL TOOL INTRODUCTION CANNULA AND METHOD OF MANUFACTURING THE SAME

Tadashi Kousai; Toshinobu Ishida, and Yousuke Moriuchi, all of Fuji, Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 176,601, Apr. 1, 1988. This application Mar. 28, 1989, Ser. No. 329,799
Claims priority, application Japan, Apr. 8, 1987, 62-86251; Aug. 14, 1987, 62-202858
Int. Cl.[4] A61M 25/00
U.S. Cl. 604—164 7 Claims



1. A medical tool introduction cannula for introducing a rod-like medical tool such as a catheter into a living body, wherein said introduction cannula comprises:

a tubular body having a longitudinal hollow portion for receiving said medical tool therethrough;

a plurality of strip members in said tubular body, and which are liquid-tightly integrated to extend along a longitudinal direction of said tubular body;

one of said strip members comprising a molded body of a mixture of ethylene-vinyl acetate copolymer and polypropylene mixed at a weight ratio of 1:1 to 1:5; and

another of said strip members disposed adjacent to and extending along said one strip member, and comprising a molded body of polypropylene;

said one strip member and said another strip member being bonded with a strength that allows said strip member to be separated from said another strip member by hand.

4,874,375

TISSUE RETRACTOR

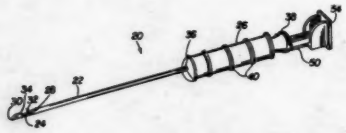
Arthur E. Ellison, Adams Rd., Williamstown, Mass. 01267

Filed Apr. 13, 1987, Ser. No. 37,841
Int. Cl.[4] A61M 5/18
U.S. Cl. 604—164 20 Claims

1. An apparatus for use during arthroscopic surgery on tissue comprising:

a substantially tubular sheath having a hollow interior and an outer surface, and

an obturator having an outer surface slidingly contained within said sheath, said obturator having a first end which is sharp and pointed, and a reduced cross-sectional area



near said first end, the outer surface of said obturator between said first end and said reduced cross-sectional area being without a slicing edge, so that the tissue may be retained against said reduced cross-sectional area without slicing through the tissue when said obturator is advanced out of said sheath.

4,874,376

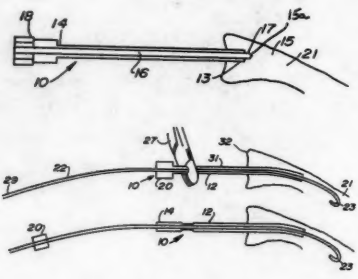
NEEDLE GUIDE ASSEMBLY

Irvin F. Hawkins, Jr., 1600 Archer Rd., Gainesville, Fla. 32610

Filed Apr. 13, 1987, Ser. No. 37,331

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—165 **24 Claims**



1. A needle guide set for use in the placement of tubular surgical instruments within a human or animal body, comprising:

a needle guide outer cannula;

a locator needle; and

a guide wire;

said needle guide outer cannula including a hollow tubular member having a distal end and a crimpable proximal end portion;

said locator needle having a proximal end and a distal end with a sharp piercing tip portion, said locator needle constructed and arranged to be removably positioned within said needle guide outer cannula with its proximal end located adjacent to the proximal end portion of said needle guide outer cannula and with said sharp tip portion projecting from said distal end of said needle guide outer cannula to facilitate penetration of the said body by said needle guide outer cannula and the positioning of the distal end of said needle guide outer cannula in the proximity of a target area within the body;

said guide wire having a distal end and a proximal end, said guide wire being insertable into the body through said needle guide outer cannula, after said locator needle has been withdrawn therefrom, said guide outer cannula proximal portion being crimped onto said guide wire to increase the effective length of said needle guide outer cannula to form a guide assembly of a length substantially greater than the length of said outer cannula for advancing the tubular surgical instrument to the target area.

4,874,377

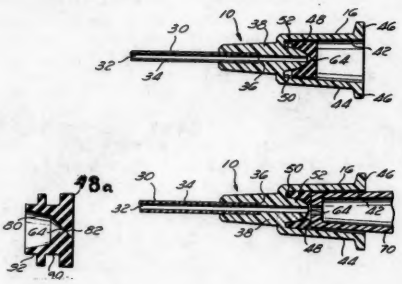
SELF-OCCLUDING INTRAVASCULAR CANNULA ASSEMBLY

Kent W. Newgard, Orange, and Mark G. Gordon, Tustin, both of Calif., assignors to Davis Newgard Revocable Family Living Trust, Calif., a part interest

Filed May 26, 1988, Ser. No. 199,118

Int. Cl.[4] P61M *5/00, 25/00*

U.S. Cl. 604—167 **8 Claims**



1. A self-occluding cannula assembly comprising:

a generally tubular cannula sheath having a proximal end, a distal end, and an inner lumen extending axially therethrough;

a connecting hub formed on the proximal end of said cannula sheath, said connecting hub having an axial bore formed therein, said axial bore being fluidly consistent with the inner lumen of said cannula sheath; and

an occluding means comprising:

a frusto conical dilator projection;

an annular seating groove formed around

said frusto conical dilator projection; and

an obturator member comprising a generally disc shaped body disposed transversely within said connecting hub, proximal to said dilator projection, said disc shaped body having at least one elastically openable and closable aperture and at least one notch formed therein;

said obturator member normally residing in an "occluding" position wherein said openable and closable aperture remains closed so as to substantially preclude fluid from flowing through said cannula lumen;

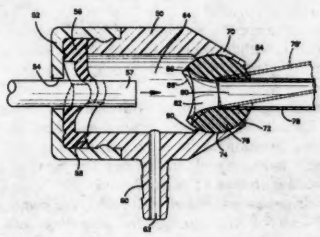
said obturator member being slidably movable relative to said dilator projection such that the application of distally directed pressure against said obturator member will cause said obturator member to distally advance to a "non-occluding" position wherein at least a portion of said obturator member is advanced into said seating groove and the notch portion of said obturator member is advanced over at least a portion of said frusto conical dilator projection such that said dilator projection exerts sufficient pressure against said obturator member to cause said openable and closable aperture to assume an open configuration whereby fluid is permitted to flow through said cannula lumen and further whereby, upon removal of said distally directed pressure, said obturator member will resiliently return to its "occluding" position.

4,874,378

CATHETER SHEATH INTRODUCER

Richard A. Hillstead, Hollywood, Fla., assignor to Cordis Corporation, Miami, Fla.

Filed Jun. 1, 1988, Ser. No. 201,473
Int. Cl.[4] A61M 25/00
U.S. Cl. 604—167 10 Claims



1. A catheter sheath introducer for use in introducing a catheter into the body vessel and comprising:

a tubular housing having proximal and distal ends and having a passageway extending through said proximal and distal ends and the housing for slideably receiving an elongated catheter so that the catheter may pass through the housing from said proximal end to said distal end before introduction into a said body vessel;

a tubular cannula extending from the distal end of said housing but not directly connected to said housing and adapted to be inserted into a said body vessel and being in communication with said passageway so that said catheter may slideably extend through the distal end of said housing and thence through said cannula and into a said body vessel;

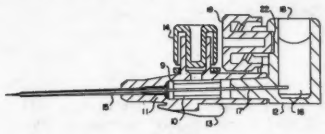
flexible coupling means connecting a first end of said cannula with said housing at the distal end thereof without any significant overlap between said first end and said housing and in such a manner that said cannula may be angularly displaced with respect to the distal end of said housing, without any bending of said cannula so that said cannula does not deform.

4,874,379

CANNULA

Clas Gabrán, Helsinki, Finland, assignor to Oy Stille Ab, Helsinki, Finland

Filed Jun. 15, 1988, Ser. No. 207,769
Claims priority, application Finland, Jun. 17, 1987, 872707
Int. Cl.[4] A61M 5/00
U.S. Cl. 604—168 5 Claims



1. A cannula for introducing liquid into the vein of a patient comprising:

a main body defining front and rear openings and a passage therebetween having a first longitudinal axis;

a catheter projecting out from said front opening and capable of of being inserted into the patient's vein to place the patient's vein into fluid communication with said passage;

a rear body defining an indicating chamber having a second longitudinal axis and having a male coupling element with an aperture passing therethrough projecting substantially perpendicularly away from said indicating chamber, said male coupling element being removably inserted into said rear opening of said main body coaxially with said first longitudinal axis so that said second longitudinal axis is substantially perpendicular to said first longitudinal axis;

a hollow steel needle affixed to said rear body and passing through said aperture of said male coupling element, said passage, and said catheter, to be thereby capable of placing said indicating chamber in fluid communication with the patient's vein when said catheter is inserted into the vein; and

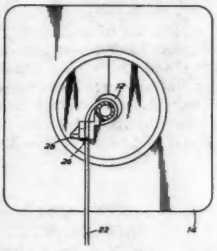
a rear plug detachably affixed to said rear body so that when said male coupling element is withdrawn from said rear opening to separate said rear body from said main body, said rear plug can be detached from said rear body and connected to said main body to cap said rear opening.

4,874,380

CATHETER RETAINING DEVICE

Mark L. Hesketh, Whytelgate, United Kingdom, assignor to E. R. Squibb and Sons, Inc., Princeton, N.J.

Filed Jan. 7, 1988, Ser. No. 142,618
Int. Cl.[4] A61M 5/32
U.S. Cl. 604—180 5 Claims



1. A releasable catheter retaining device comprising a substantially planar flange having a central hole therein and mounted on a pad of medical grade skin-compatible adhesive material, the flange being made in one piece with a post extending from the side of the flange opposite to the pad and with an elongated tab extending from the post, there being a slot in the post for receiving the free end of the tab, the arrangement being such that the tab can be passed through the slot after encircling a catheter which extends through the hole, and wherein the post has a resilient detent associated with the slot, the detent having a detent tooth, the detent and tooth being movable in a plane parallel to the plane of the flange between a first position in which the detent tooth grips the tab in the slot and a second position in which the tooth is disengaged from the tab and at least partially withdrawn from the slot and the tab is released.

4,874,381

HYPODERMIC SYRINGE

Udo J. Vetter, Ravensburg, Fed. Rep. of Germany, assignor to Arzheimittel GmbH Apotheker Vetter & Co. Ravensburg, Ravensburg, Fed. Rep. of Germany

Filed Jun. 24, 1988, Ser. No. 211,229
Claims priority, application European Pat. Off., Feb. 16, 1988, 88 102.236.2
Int. Cl.[4] A61M 5/08
U.S. Cl. 604—191 10 Claims

1. A medicinal syringe, comprising:

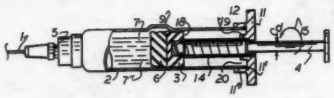
a generally cylindrical syringe body formed with a first end having a needle-receiving fitting, a second and opposite said first end and a bypass intermediate said ends;

a first piston slidable in said body proximal to said second end;

a second piston slidable in said body between said first piston and said first end, said pistons defining a liquid compartment between them adapted to communicate with a downstream compartment between said second piston and said first end through said bypass upon displacement of said second piston so that opposite sides thereof are bridges by said bypass;

a piston-actuating stem axially engaged by said first piston, extending out of said second end and axially displaceable to drive said pistons toward said first end of said body; and

velocity damping means formed at said second end or said body for restricting a velocity of displacement of said first piston substantially until said first piston reaches said



bypass, thereby limiting a velocity with which liquid from said liquid compartment enters said downstream compartment, and thereafter disengaging to permit less-braked axial displacement of said pistons by said stem, said damping means including a cap fitted onto said second end and formed with a central bore having an internal screwthread, said stem having over part of its length an axially extend in shank having an external screwthread threadedly engaging said internal screwthread, and shank having a length such that said external screwthread passes out of said internal screwthread upon rotation of said stem to advance said first piston as said first piston reaches said bypass.

4,874,382

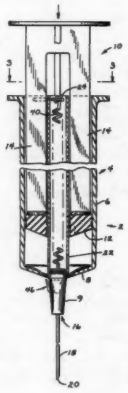
SAFETY SYRINGE

Peer Lindemann, West Bend, and Victor M. Haughton, Dousman, both of Wis., assignors to Servetus Partnership, Milwaukee, Wis.

Filed Oct. 15, 1987, Ser. No. 109,189

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—195 **19 Claims**



1. A syringe, comprising:

a body portion for holding fluid;

a hollow needle interconnected with said body portion for transferring fluid between said body portion and a patient, said needle having a head portion and a sharpened tip, said needle being movable between an extended position in which said sharpened tip projects outwardly from said body portion and said head portion is positioned such that the interior of said hollow needle is in communication with the interior of said body portion, and a retracted position in which the sharpened tip of said needle is enclosed;

a plunger associated with said body portion for ejecting fluid through said needle from the interior of said body portion of drawing fluid through said needle into the interior of said body portion;

a protective sheath associated with said syringe into which needle is withdrawn into its retracted position after use for enclosing the tip of said needle to prevent accidental contact therewith;

disarming means associated with said syringe for disarming said needle after use by moving said needle from its extended position to its retracted position, said disarming means including biasing means for biasing said needle toward its retracted position; and

actuator means associated with said syringe and actuable by the user of said syringe for actuating said disarming means, said actuator means comprising releasable retainer means for retaining said syringe in an armed condition wherein said needle is in its extended position during use against the force of said biasing means, and wherein said releasable retainer means releases said needle upon actuation to withdraw said needle into said sheath by the force of said biasing means to convert said syringe to its disarmed condition to prevent accidental contact therewith, said releasable retainer means comprising a movable rod associated with said body portion of said syringe and movable ball-type detent means associated with said syringe for retaining said needle in its extended position against the biasing force of said biasing means during use, and wherein said rod is movable so as to effect movement of said ball-type detent mechanism, said movement of said ball-type detent mechanism effecting a release of said needle for allowing said needle to be withdrawn into said protective sheath by said biasing means after use to achieve said disarmed condition.

4,874,383

SYRINGE SHIELD

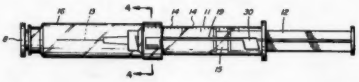
R. David McNaughton, 95 Dobler Ave., Red Deer, Alberta, Canada T4R 1X3

Filed Dec. 8, 1987, Ser. No. 130,277

Claims priority, application Canada, Mar. 17, 1987, 532233

Int. Cl.[4] A61M *5/32*

U.S. Cl. 604—198 **5 Claims**



1. A syringe comprising:

a barrel having a hypodermic needle mounted on one end thereof, said barrel being of transparent cylindrical form over the major portion of its length;

a piston mounted for movement longitudinally within said barrel and connected to a handle that projects from the opposite end of said barrel;

a sleeve dimensioned to fit over said barrel, and mounted to be slidable therealong, said sleeve having an internal projection and being movable axially between an extended position wherein it projects from said one end of said barrel beyond the tip of said needle and a retracted position wherein it coaxially surrounds said barrel and exposes said needle for use, said sleeves having a length that corresponds to that of said barrel and comprising a cylindrical wall that is transparent such that in said retracted position

it affords unimpeded visibility of substantially the entire extent of said transparent portion and thus the interior of said barrel;

first locking means for securely locking said sleeve in said extended position in which said needle is fully covered to prevent injury to a user by said needle, said first locking means comprising walls that define a locking recess in said barrel into which recess said internal projection can be positioned by predetermined movement of said sleeve relative to said barrel in said extended position, said barrel including an inclined ramp that approaches said locking recess to guide and facilitate entry of said projection into said recess; and

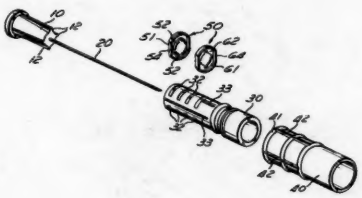
a second locking means to securely lock said sleeve when in said retracted position against axial movement relative to said barrel.

4,874,384

NEEDLE SAFETY GUARD

Chris E. Nunez, Garden Grove, Calif., assignor to International Medical Innovators, Inc., San Clemente, Calif.

Filed Jul. 13, 1987, Ser. No. 72,665
Int. Cl.[4] A61M 5/32
U.S. Cl. 604—198 **6 Claims**



5. An apparatus capable of being mounted to a hub of a medical needle in order to guard the tip of the medical needle, the apparatus comprising:

a first tubular sleeve;

engagement means, retained and carried by the first tubular sleeve, for frictionally engaging a hub of the medical needle in order to mount the first tubular sleeve coaxially thereupon; and

a second tubular sleeve sliding from the first tubular sleeve to a sufficient extention so as to guard a tip of the medical needle, said engagement means comprising a clip insert formed substantially in the shape of an internal tooth lock washer.

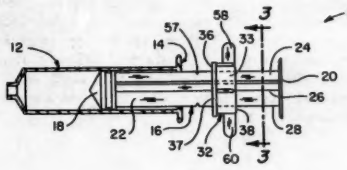
4,874,385

PLUNGER LOCK DEVICE

John P. Moran, Herculaneum; Richard W. Gilson, Dellwood, and Thomas W. Heubel, Chesterfield, all of Mo., assignors to Sherwood Medical Company, St. Louis, Mo.

Filed Dec. 16, 1987, Ser. No. 133,302
Int. Cl.[4] A61M 5/00
U.S. Cl. 604—208 **13 Claims**

1. In a syringe having a syringe housing with a plunger slidably positioned therein and extendable therefrom, the improvement comprising a locking member mounted on the plunger externally of the syringe housing, said locking member and said plunger having means cooperatively engageable in selected relative positions thereof including inwardly extending cam means on the locking member and means on the plunger member engageable therewith in said selected relative position, said locking member being angularly movable on the plunger between a first position in which the locking member is free to be moved along the length of the plunger to any desired position therealong and a second position angularly related to the first position in any desired position therealong whereby said cooperatively engageable means become engaged so that the locking member and the plunger move in



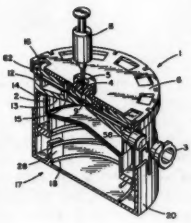
concert, said last named second position limiting longitudinal movement of the plunger relative to the syringe housing.

4,874,386

FLUID DISPENSING DEVICE

Matthew O'Boyle, Houston, Tex., assignor to STA-SET Corporation, Houston, Tex.

Continuation-in-part of Ser. No. 938,620, Dec. 5, 1986, Pat. No. 4,822,344. This application May 15, 1987, Ser. No. 49,940
Int. Cl.[4] A61D 5/005
U.S. Cl. 604—246 **16 Claims**



1. An ambulatory fluid drug dispensing device comprising a reservoir for a liquid to be administered parenterally to a patient, means for introducing liquid in the reservoir, means for placing the liquid in the reservoir under constant pressure for dispensing the liquid from the device, said means for placing including a spring for applying a constant force to the liquid in the reservoir and means for tensioning said spring to initially apply the constant force on the liquid in the reservoir after the liquid has been introduced in the reservoir and flow control means for adjustably controlling the flow rate of the liquid dispensed from the device, said flow control means comprising means defining a elongated passage through which liquid from said reservoir can be flowed to an outlet of said device and means for changing the length of said elongated passage through which the liquid is flowed to thereby change the flow rate of the liquid through the passage.

4,874,387

COVER FOR BODY FLUID DRAINAGE BAG AND TUBING

Delores A. Boone, 1092 Kennedy St., Norfolk, Va. 23513

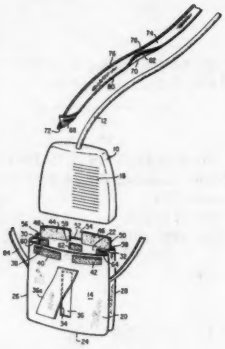
Filed Nov. 1, 1988, Ser. No. 265,440
Int. Cl.[4] A61M 1/00
U.S. Cl. 604—326 **8 Claims**

1. A cover for a body fluid drainage bag and tubing in combination comprising:

a bag cover having front and back panels which are joined along end and bottom edges, but which are separated along a top edge to form an open edge, said bag cover

being of a size for enclosing a transparent body-fluid bag between the front and back panels;

a tubing cover comprising an elongated sheet of flexible material having first and second opposite side edges and first and second opposite end edges, said tube cover further including a tube forming attachment means for selectively attaching the first and second opposite side edges together so as to hold the sheet of flexible material in a tubular shape or for selectively separating to allow the elongated sheet of flexible material to be opened up with its side edges apart;



an end-edge attachment means for engaging said first end of said elongated sheet of flexible material and said bag cover near the top edge thereof for holding said first end of said elongated sheet in said open edge of said bag cover;

whereby a fluid drainage bag can be placed in said bag cover with said tubing extending through said open edge, said tubing outside said bag cover being covered by said elongated sheet of flexible material held in a tubular shape by said tube forming attachment means about said tubing.

4,874,388

MULTI-LAYER DELIVERY SYSTEM

Patrick S. L. Wong, Hayward; Felix Theeuwes, and James B. Eckenhoff, both of Los Altos, all of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

Filed Jun. 25, 1987, Ser. No. 66,906

Int. Cl.[4] A61K *9/24*

U.S. Cl. 604—891.1 **26 Claims**

1. A drug dispenser for use in a fluid-containing environment comprising, in combination:

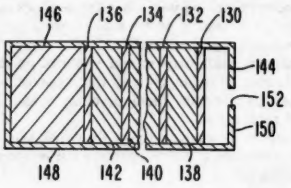
a. a rigid housing having an outlet at one end thereof;

b. a fluid activated driving member within a portion of said housing proximate the end of said housing opposite to said outlet and in contact with said housing, at least that portion of the housing contacting the driving member having a predetermined permeation rate to the environmental fluid;

c. a first set of drug layers longitudinally disposed within said housing between said driving means and said outlet;

d. a second set of layers longitudinally disposed within said housing and alternating with said first drug layers; and

e. an expansion chamber defining an empty volume within said housing between the drug layer most proximate the



outlet and the outlet; whereby said drug layers must be displaced through the expansion chamber by said driving means after exposure of said dispenser to the fluid environment.

4,874,389

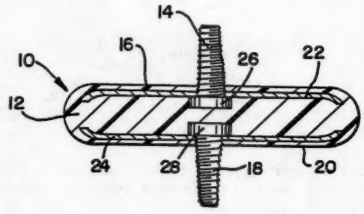
REPLACEMENT DISC

Ernest L. Downey, 10559 S. Ave. G., Chicago, Ill. 60617

Filed Dec. 7, 1987, Ser. No. 129,302

Int. Cl.[4] A61F *2/44*

U.S. Cl. 623—17 **20 Claims**



1. A replacement disc for use between adjacent vertebrae comprising:

a unitary body portion having substantially opposing first and second surfaces and being adapted to fit and be held between said adjacent vertebrae;

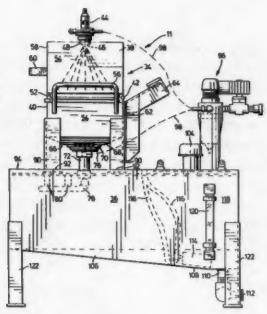
first threaded means having a first proximal end substantially level with said first surface and a first distal end distally therefrom, said first threaded means being tapered in a direction from said first proximal end to said first distal end wherein said first distal end is about 30% to about 60% of the cross sectional area of said first proximal end; and

second threaded means having a second proximal end substantially level with said second surface and a second distal end distally therefrom, said second threaded means being tapered in a direction from said second proximal end to said second distal end wherein said second distal end is about 30% to about 60% of the cross-sectional area of said second proximal end.

4,874,390
METHOD AND APPARATUS FOR TINTING YARN

Clayton M. Legault, Kingston, Canada, assignor to Du Pont Canada Inc., Mississauga, Canada

Filed Sep. 29, 1988, Ser. No. 251,962
Int. Cl.[4] D06B *1/02*
U.S. Cl. 8—149.1 14 Claims



8. Apparatus for tinting yarn, said apparatus comprising a tinting chamber having openings therein to allow for passage of yarn therethrough, yarn guide means for guiding said yarn through said tinting chamber, spray nozzles locatable within said chamber for spraying a fine atomized spray of tint onto said yarn within said chamber, said nozzles each having a compressed air inlet and a tint inlet, and means for exhausting excess tint from said chamber; and

a tint reservoir located beneath said tinting chamber, said tint reservoir being connected to the tint inlets of the nozzles whereby compressed air entering said air inlet siphons tint from said reservoir to transport it to said nozzles.

13. A process for tinting yarn comprising passing yarn through an at least partially enclosed spraying zone, spraying yarn with tint in said spraying zone, and simultaneously removing excess tint from said spraying zone, wherein said step of removing excess tint comprises providing a draining zone connected to said spraying zone and to a tint storage zone, creating suction in said draining zone to draw excess tint from said spraying zone through said draining zone to said reservoir and deflecting excess tint in said spraying zone toward said draining zone, and wherein the tint storage zone is located below the spraying zone and wherein tint is transported to said spraying zone by siphoning.

4,874,391
PROCESS FOR PHOTOCHEMICAL STABILIZATION OF POLYAMIDE FIBER MATERIAL AND MIXTURES THEREOF WITH OTHER FIBERS: WATER-SOLUBLE COPPER COMPLEX DYE AND LIGHT-STABILIZER

Gerhard Reinert, Allschwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 20, 1987, Ser. No. 75,805
Claims priority, application Switzerland, Jul. 29, 1986, 3034/86
Int. Cl.[4] D06M *13/26, 11/04;* D06P *1/62, 3/24*
U.S. Cl. 8—442 23 Claims

1. A process for the photochemical stabilization of polyamide fibre material or mixtures thereof with other fibre materials, which comprises applying to the fibre material from an aqueous bath a mixture of

(A) a water-soluble copper complex azo dye or a mixture of a water-soluble copper complex azo dye and a non-chromophoric water-soluble copper complex which has fibre affinity and is selected from the group consisting of bisazomethines, acylhydrazones, semicarbazones and thiosemicarbazones of aromatic aldehydes and ketones,

(B) a light stabilizer selected from the group consisting of 2-hydroxybenzophenone, 2-(2'-hydroxyphenyl)-benzotriazole and sterically hindered amines, and if desired

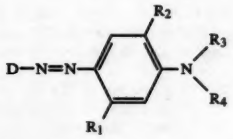
(C) an antioxidant.

4,874,392
MONOAZO DYES HAVING A SUBSTITUTED 1,4-PHENYLENE COUPLING COMPONENT RADICAL HAVING ONE C_{8-14} ALKYL GROUP OR MOIETY

Beat Henzi, Basle, Switzerland, assignor to Sandoz Ltd., Basle, Switzerland

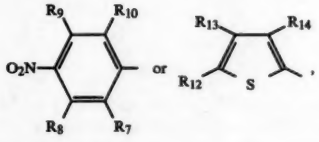
Filed Jul. 29, 1987, Ser. No. 79,080
Claims priority, application Fed. Rep. of Germany, Aug. 1, 1986, 3626139
Int. Cl.[4] C09B *29/08;* D06P *1/18, 3/54*
U.S. Cl. 8—662 20 Claims

1. A process of dyeing a textile substrate comprising applying a compound of the formula



to a textile substrate from an aqueous medium, wherein

D is



wherein

R_7 is hydrogen, cyano or halo,

R_8 is hydrogen or chloro,

R_9 is hydrogen or chloro, with the proviso that at least one of R_8 and R_9 is hydrogen,

R_{10} is cyano or nitro,

R_{12} is formyl, cyano, nitro, (C_{1-4}alkoxy)carbonyl or (C_{1-4}alkyl)carbonyl,

R_{13} is hydrogen, chloro, C_{1-3}alkyl or phenyl, and

R_{14} is cyano, nitro or (C_{1-4}alkoxy)carbonyl,

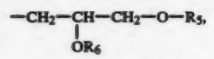
R_1 is hydrogen; C_{1-2}alkyl; C_{1-2}alkoxy; formylamino; (C_{1-4}alkyl)carbonylamino; (C_{1-4}alkyl)carbonylamino the alkyl group of which is substituted by 1 to 3 substituents independently selected from halo, C_{1-3}alkoxy, cyano, phenyl, phenoxy and benzyloxy; (C_{2-4}alkenyl)carbonylamino; halo(C_{2-4}alkenyl)carbonylamino; benzoylamino; benzoylamino the phenyl group of which is substituted by 1 to 3 substituents independently selected from halo, C_{1-4}alkyl and C_{1-4}alkoxy; (C_{1-4}alkoxy)carbonylamino; (C_{1-4}alkoxy)carbonylamino the alkyl moiety of which is substituted by 1 to 3 substituents independently selected from halo, C_{1-3}alkoxy, cyano, phenyl, phenoxy and benzyloxy; (C_{8-14}alkyl)carbonylamino or (C_{8-14}alkoxy)carbonylamino,

R_2 is C_{1-4}alkoxy or 2-(C_{1-4}alkoxy)ethoxy,

R_3 is hydrogen, C_{1-4}alkyl, C_{8-14}alkyl, 2-(C_{8-14}alkoxy)carbonylethyl, 2-(C_{8-14}alkyl)carbonyloxyethyl or 2-(C_{8-14}alkoxy)carbonyloxyethyl, and

R_4 is hydrogen, C_{1-4}alkyl, 2-cyanoethyl, 2-(C_{1-3}alkoxy)ethyl, 2-(C_{1-4}alkyl)carbonyloxyethyl, 2-(C_{1-4}alkoxy)-

carbonylethyl, 2-(C_{1-4}alkoxy)carbonyloxyethyl, C_{3-4}alkenyl,



C_{8-14}alkyl, 2-(C_{8-14}alkyl)carbonyloxyethyl, 2-(C_{8-14}alkoxy)carbonylethyl or 2-(C_{8-14}alkoxy)carbonyloxyethyl, wherein

R_5 is C_{1-4}alkyl, allyl, (C_{1-3}alkyl)carbonyl, phenyl or phenyl substituted by 1 to 3 substituents independently selected from halo, C_{1-2}alkyl and C_{1-2}alkoxy, and

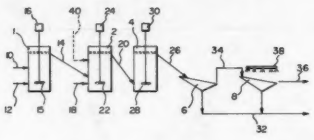
R_6 is hydrogen, C_{1-4}alkyl or (C_{1-3}alkyl)carbonyl, with the proviso that one and only one of R_1, R_3 and R_4 is or contains a C_{8-14}alkyl group or moiety.

4,874,393

METHOD OF PRODUCING FUEL OF RELATIVELY HIGHER CALORIFIC VALUE FROM LOW RANK AND OXIDIZED COAL

Josef A. Mikhlin, Montreal; C. Edward Capes, Ottawa; Haresh S. Divanji, Montreal, and Richard D. Coleman, Orleans, all of Canada, assignors to Canadian Patent and Development Ltd., Ottawa, Canada

Filed Jun. 29, 1987, Ser. No. 67,111
Claims priority, application Canada, Jul. 4, 1986, 513,163
Int. Cl.[4] B01J *2/06;* C01L *9/10*
U.S. Cl. 44—20 2 Claims



1. A method of producing fuel of relatively higher calorific value from low-rank and oxidized coal, comprising;

(a) agitating to thoroughly mix electrolyte selected from the group consisting of concentrated sulphuric acid, concentrated hydrochloric acid and sulphur trioxide gas with an aqueous slurry of the coal comminuted to an ash release particle size essentially smaller than 35 mesh Tyler Standard Screen, to condition the coal slurry for oil agglomeration of the carbonaceous portion of the coal therein by a coal derived oil; then

(b) adding coal derived agglomerating oil to the conditioned coal slurry, the coal slurry containing about 10 to about 40 wt% oil, and about 0.5 to about 5.0 vol % electrolyte; then

(c) agitating the mixture of coal derived agglomerating oil and conditioned coal slurry to form agglomerates of carbonaceous material of the coal in the mixture, the agglomerates containing about 10 to about 50 wt %, coal derived oil; then

(d) separating the agglomerates from the remainder of the mixture; and then

(e) washing the separated agglomerates with water.

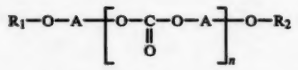
4,874,394

CRUDE OIL AND FUEL OIL COMPOSITIONS

Robert D. Tack, Oxford; Rodger F. Andrews, Didcot, and Sally J. Ayres, Stanton Harcourt, all of United Kingdom, assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Jan. 22, 1988, Ser. No. 146,976
Claims priority, application United Kingdom, Jan. 27, 1987, 87-01696
Int. Cl.[4] C10L *1/18*
U.S. Cl. 44—70 17 Claims

1. A wax containing oil composition comprising (a) crude oil or fuel oil and (b) a wax crystal modifying amount of at least one polycarbonate having a number average molecular weight from about 300 to about 3000 and represented by the structural formula:



wherein R_1 is selected from the group consisting of hydrogen, alkyl, alkoxy carbonyl, alkyl carbonyl, aralkyl, aralkoxycarbonyl, aralkylcarbonyl, alkaryl, alkaryl oxy carbonyl, and alkaryl carbonyl; R_2 is independently selected from the same groups defined in connection with R_1 provided R_2 may not be alkoxy carbonyl, aralkoxy carbonyl or alkaryloxy carbonyl; A is independently selected from the group consisting of C_3 to about C_{18} alkylene, cycloalkylene, and arylene, provided that when A is alkylene, it can be interrupted by a bridging group selected from the group consisting of oxy, thio, amido ureylene, carbamate and tertiary amino; and n is a number greater than 2.

4,874,395

AMINE NEUTRALIZED ALKENYLSUCCINIC ANHYDRIDE PROPYLENE GLYCOL ADDUCTS AS CORROSION INHIBITORS FOR HYDROCARBON FUELS

George R. Meyer, Missouri City, Tex., assignor to Nalco Chemical Company, Naperville, Ill.

Filed Sep. 2, 1988, Ser. No. 239,801
Int. Cl.[4] C10L *1/18;* C07C *101/02*
U.S. Cl. 44—71 5 Claims

1. A corrosion inhibitor composition for hydrocarbon fuels from the group consisting of gasolines and diesel fuel oils comprising a C_{10}–C_{24} alkenyl succinic anhydride esterified with between 0.5–1.5 moles of a water-soluble glycol and then neutralized with an aliphatic hydrocarbon amine.

4,874,396

BRIQUETS FOR SMOKE SEASONING FOOD PRODUCTS

H. C. McLeod, 1407 South Cir., Mt. Prospect, Ill. 60056

Filed Jul. 18, 1988, Ser. No. 220,478
Int. Cl.[4] C10L *5/40*
U.S. Cl. 44—589 15 Claims

1. For use in cooking food products with charcoal or artifically heated coals, briquets adapted to be placed directly on or proximate to hot coals effective to generate fumes and/or smoke for seasoning the food products with spices as the products are being cooked, said briquets comprising carrier means and a seasoning liquid impregnated into the carrier means, said carrier means initially being dried and readily absorbant and afterwards forming between 70–90% of the weight of the briquets and the seasoning liquid forming between 10–30% of the weight of the briquets, said briquets being wet both in appearance and to the touch; the seasoning liquid being noncombustible and the briquets supporting combustion only after extended exposure to the heat of the coals; the seasoning liquid including spices in the form of liquid components of wine, soy sauce, whiskey, molasses and water, and solid components of bay leaves, onion powder, and garlic powder; the liquid and solid components being blended together in a ratio by weight of between 0.1–3% solid to 99.9–97% liquid.

4,874,397

COAL GASIFICATION PROCESS

Walter L. Heitz, Edwardsville, Ill., assignor to Shell Oil Company, Houston, Tex.

Filed Dec. 29, 1987, Ser. No. 138,770
Int. Cl.[4] C10J 3/00, 3/84
U.S. Cl. 48—210 4 Claims

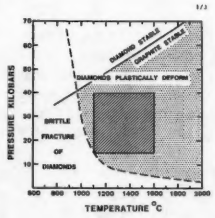
1. A process for the gasification of coal comprising (a) oxidizing particulate coal under conditions to produce synthesis gas and producing synthesis gas at a temperature of from about 1050° C. to about 1800° C. containing molten flyslag particles;
(b) passing said synthesis gas and molten flyslag particles to a heat exchange zone having walls cooler than the melting point of said flyslag particles, quenching and cooling said synthesis gas and solidifying said flyslag particles in said heat exchange zone during which flyslag deposits are formed on said walls, the superficial velocity of the synthesis gas and flyslag particles passing through said heat exchange zone being maintained at a rate of from about 4 meters per second to about 12 meters per second;
(c) increasing the rate of flow of the synthesis gas and flyslag particles through said heat exchange zone to a rate greater than about 12 meters per second for a time sufficient to reduce the flyslag deposits present on the walls of said heat exchange zone; and
(d) resuming the flow of the synthesis gas and flyslag particles through said heat exchange zone at a rate of from about 4 meters per second to about 12 meters per second.

4,874,398

DIAMOND COMPACTS AND PROCESS FOR MAKING SAME

Alfred E. Ringwood, 3 Vancouver St., Redhill, Australia

PCT No. PCT/AU85/00201, § 371 Date Jun. 19, 1986, § 102(e) Date Jun. 19, 1986, PCT Pub. No. WO86/01433, PCT Pub. Date Mar. 13, 1986
PCT Filed Aug. 23, 1985, Ser. No. 882,937
Claims priority, application Australia, Aug. 24, 1984, PG6772/84
Int. Cl.[4] B24D 3/00
U.S. Cl. 51—293 18 Claims



1. A process for producing a diamond compact for cutting, turning drilling, and otherwise working ultra-hard ceramics, carbides and rocks which comprises:
(i) intimately mixing a mass of particulate diamond crystals with a solid particulate powder bonding agent in the proportions 60–95 volume percent of diamond to 40–5 volume percent of bonding agent, the bonding agent comprising an element which reacts with carbon to form a stable carbide having a melting point exceeding about 1600° C. or a metallic alloy containing such element;
(ii) subjecting the mixture to a temperature in the range of 1100°–1600° C. at a mean confining pressure in the range of 10 kbars to 40 kbars, said combination of mean confining pressure and temperature lying within the graphite stability field; and
(iii) maintaining the temperature and pressure conditions of the mixture for a period greater than about 3 minutes to cause said element in the bonding agent to react extensively with carbon in the diamond crystals to form an interstitial carbide phase having a melting point about 1600° C. providing a strong bond between the diamond crystals while inhibiting the formation of free graphite by retrogressive transformation from diamond, said period being sufficient to result in substantial plastic deformation of the diamond crystals whereby contact between the diamond crystals occur over extended mating surfaces and also to result in substantial chemical equilibrium between the bonding agent and the diamond crystals whereby there is produced a thermally stable diamond compact having a minimum melting point above 1600° C. and a compressive strength above 10 kbars at ambient temperature.

4,874,399

ELECTRET FILTER MADE OF FIBERS CONTAINING POLYPROPYLENE AND POLY(4-METHYL-1-PENTENE)

John F. Reed, Arden Hills, and Marvin E. Jones, Stillwater, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 25, 1988, Ser. No. 147,989
Int. Cl.[4] B01D 35/06
U.S. Cl. 55—2 20 Claims

1. Method of removing particulate matter from a gaseous fluid comprising passing the fluid through an electret filter comprising electret fibers containing at least one percent by weight of poly(4-methyl-1-pentene).

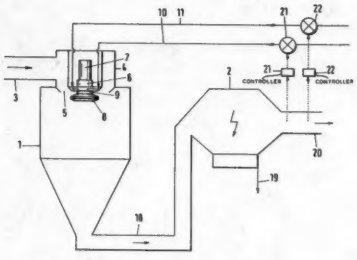
4. Electret filter comprising electret fibers containing polypropylene and at least one percent by weight of poly(4-methyl-1-pentene) per 100 parts of total polyolefin.

4,874,400

METHOD OF AND APPARATUS FOR REMOVING GASEOUS POLLUTANTS FROM EXHAUST GASES

Egon Jury, Egelsbach, Fed. Rep. of Germany, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 14, 1988, Ser. No. 244,666
Claims priority, application Fed. Rep. of Germany, Sep. 25, 1987, 3732353
Int. Cl.[4] B01D 47/16; B03C 3/01
U.S. Cl. 55—8 10 Claims



1. A method of removing a gaseous pollutant from a gas stream, comprising the steps of:
(a) treating said gas stream in a spray absorber by
(a_1) rotating an atomizing disk having a compartment at the bottom in said absorber;
(a_2) introducing separately through the atomizing disk into the compartment at the bottom of said disk, water and a suspension in a liquid of particles capable of reacting with said gaseous pollutant to absorb said gaseous pollutant in said particles;
(a_3) mixing the water and the suspension in said compartment at the bottom of said disk for a residence time

sufficiently short to ensure that reaction products formed as the water is mixed with the suspension will not be able to deposit anywhere along a path along which they flow jointly before entering the gas stream; and

(a_4) discharging into said gas stream in said absorber in an atomized spray, a mixture of the water and the suspension from atomizing nozzles of said disk during the rotation thereof to cool said gas stream and take up said gaseous pollutant in said particles while suspending said particles in said gas stream; and

(b) thereafter collecting said particles from said gas stream in a dust collector.

4,874,401

GAS SEPARATION MEMBRANES FROM BISPHENOL AF POLYCARBONATES AND POLYESTERCARBONATES

Thomas O. Jeanes, Antioch, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 20, 1987, Ser. No. 123,495
Int. Cl.[4] B01D *53/22*
U.S. Cl. 55—16 **28 Claims**

1. A method of separating gases comprising

(a) contacting with a feed gas mixture under pressure one side of a semi-permeable membrane comprising a thin discriminating layer of polycarbonate or polyestercarbonate, wherein the diphenolic residue in the polymer backbone is based on bisphenol AF;

(b) maintaining a pressure differential across the membrane under conditions such that a component(s) of the feed gas selectively permeates through the membrane from the high pressure side to the low pressure side of the membrane;

(c) removing the permeated gas which is enriched in the faster permeating component(s) from the low pressure side of the membrane; and

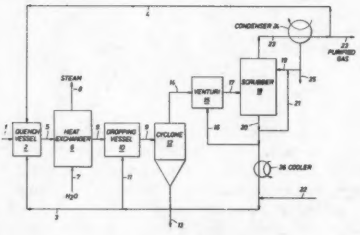
(d) removing the nonpermeated gas which is depleted in the faster permeating component(s) from the high pressure side of the membrane.

4,874,402

PROCESS FOR PURIFYING AND COOLING A HOT GAS

Jacobus E. Vogel, The Hague, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 30,279, Mar. 24, 1987, abandoned, which is a continuation of Ser. No. 688,281, Jan. 4, 1985, abandoned, which is a continuation of Ser. No. 443,981, Nov. 23, 1982, abandoned. This application Jul. 13, 1988, Ser. No. 220,449
Int. Cl.[4] B01D *53/14*
U.S. Cl. 55—22 **18 Claims**



1. A process for purifying and cooling hot synthesis gas containing flyash particles comprising

(a) passing said synthesis gas through at least one heat exchange to cool said synthesis gas;

(b) passing cooled synthesis gas from step (a) through at least one cyclone, and separating flyash particles from said synthesis gas in at least one cyclone;

(c) passing synthesis gas, from which flyash particles have been removed in step (b), through a water scrubber, and forming purified synthesis gas and an aqueous suspension of flyash particles; and

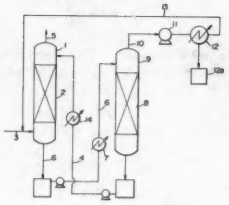
(d) injecting at least a portion of the aqueous suspension formed in step (c) into the synthesis gas before entry of the synthesis gas into said at least one heat exchanger and agglomerating the flyash particles in the hot synthesis gas, the aqueous suspension, or in the hot synthesis gas and the aqueous suspension by addition of and adhesive agent to the hot synthesis gas, the aqueous suspension, or the hot synthesis gas and the aqueous suspension.

4,874,403

PROCESS FOR TREATING WASTE GASES CONTAINING TRICHLOROTRIFLUOROETHANE AND APPARATUS THEREFOR

Toshiharu Hasumoto; Kunio Kashiwada; Minoru Konishi, and Nobuo Fujishiro, all of Kawasaki, Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 15, 1988, Ser. No. 232,497
Claims priority, application Japan, Dec. 25, 1987, 62-328958
Int. Cl.[4] B01D *19/00*
U.S. Cl. 55—55 **1 Claim**



1. A method of treating a trichlorotrifluoroethane containing waste gas which comprises contacting at atmospheric pressure or under pressurized conditions a trichlorotrifluoroethane containing waste gas with at least one absorber selected from the group consisting of saturated mineral oils, alkyl diphenyl ether based oils, silicone oils, trifluorochloroethylene based oils, and perfluoropolyether based oils, having a vapor pressure of not higher than 7.6×10^{-2} mmHg at 25° C. and a viscosity of not higher than 500 cp at 25° C., to remove trichlorotrifluoroethane contained in the waste gas by absorbing, and depressurizing the absorber having absorbed therein flon-113 to recover trichlorotrifluoroethane.

4,874,404

VACUUM CLEANER

Jerald O. Boswell, P.O. Box 5666, Wilmington, N.C. 28403

Filed Mar. 1, 1989, Ser. No. 317,536
Int. Cl.[4] B01D *47/02*
U.S. Cl. 55—86 **13 Claims**

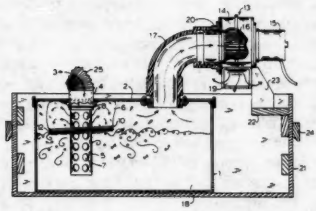
1. A vacuum cleaner, comprising:

(a) an enclosed reservoir of water having an air entry tube connected to an enclosed space above the water;

(b) a vacuum production means connected to the enclosed space;

(c) a float means connected to said air entry tube, wherein said float means comprises flexible bag cylinder attached to said air entry tube at a first end of said bag cylinder, said

bag cylinder surrounding a pipe cylinder; and a buoyant piece connected to a second end of said bag cylinder;

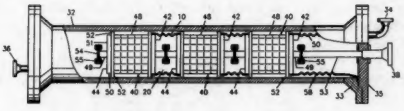


wherein said pipe cylinder is within said float means and is connected to said air entry tube, and said pipe cylinder has a plurality of holes.

4,874,405
COUPLING FLUID SEPARATION MEMBRANE ELEMENTS

Bhupender S. Minhas, Columbia, Md., assignor to W. R. grace & Co.-Conn., New York, N.Y.

Filed Feb. 14, 1989, Ser. No. 310,429
Int. Cl.[4] B01D *13/00*
U.S. Cl. 55—158 **8 Claims**



1. An improved method of coupling in series the membrane elements of a fluid separation module containing a plurality of membrane elements for separating fluids from a fluid mixture, each membrane element having a membrane with a feed end and a residual end, the improvement comprising the steps of:

(a) providing a flexible coupling member for each membrane element with the optional exception of the last membrane element in the series; each coupling member having an open first end adapted to be secured to the residual end of a membrane element, an open second end adapted to be secured to the feed end of a membrane element and a passage between said first and second ends, the walls of said passage being essentially impervious to the fluid mixture; and

(b) securing the first end of the coupling members to the residual end of each membrane element with the optional exception of the last membrane element in the series, and securing the second end of the coupling members to the feed end of the next membrane element in the series, if any.

4,874,406
JET SPRAY ATMOSPHERIC DEAERATOR

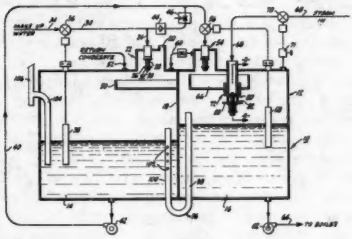
Martin Bekedam, 103 Brookline, Moraga, Calif. 94556

Filed Nov. 28, 1988, Ser. No. 276,926
Int. Cl.[4] B01D *19/00*
U.S. Cl. 55—198 **19 Claims**

18. An atmospheric jet spray deaerator unit comprising:

a first vessel means for containing a quantity of water at atmospheric pressure, the first means having an unrestricted vent means for venting the first vessel means to atmosphere, the vent means including a water spray nozzle to purge vented non-condensible gases of water vapor and steam;

a second vessel means for containing a quantity of water under pressure slightly higher than atmospheric pressure, the second vessel means having a steam jet deaerator means for deaerating water in the second vessel means, the steam jet deaerator means including a steam supply conduit having a steam discharge valve with a water dispersement element and means for supplying water at the dispersement element in contact with steam discharged from the steam supply conduit, and, steam supply regulating means with a pressure sensing means for sensing pressure in the second vessel means and controlling the regulating means to maintain a predetermined pressure in the second vessel means by pressurized steam supplied to the second vessel means;



a safety means communicating between the first vessel means and the second vessel means for releasing excess pressure in the second vessel means to the first vessel means;

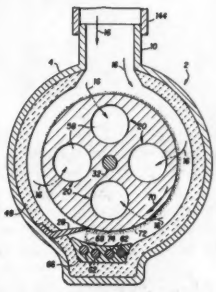
a non-condensible gas relief means for passing non-condensible gases from the second vessel means to the first vessel means that includes a constricted gas flow conduit means having a water spray nozzle in the second vessel means for purging passed gases of water vapor and steam; and,

water conduit means for circulating water from the first vessel means to the steam jet deaerator means in the second vessel means, circulating water from the second vessel means to a boiler and receiving condensate in the first vessel means from the boiler.

4,874,407
REGENERABLE FILTER

Leonard R. Lefkowitz, 14 Alpine Dr., Latham, N.Y. 12110

Filed Feb. 7, 1989, Ser. No. 306,911
Int. Cl.[4] B01D *46/04*
U.S. Cl. 55—213 **16 Claims**



1. A regenerable filter for exhaust gas streams containing combustible particles wherein said exhaust gas streams pass through a filter medium which is provided to remove said combustible particles from said exhaust gas streams and to

cause said combustible particles so removed to build up upon a surface of said filter medium, comprising:

a sealed housing having a entry conduit and an exit conduit for passage of said exhaust gas streams into and out of said sealed housing, respectively;

at least one filter medium having at least one porous surface and being disposed within said sealed housing between said entry conduit and said exit conduit so that said exhaust gas streams can flow into said sealed housing at said entry conduit, through said at least one porous surface and out of said sealed housing at said exit conduit, said at least one filter medium being sealed relative to said exhaust gas streams to prevent passage of said exhaust gas streams to said exit conduit except through said at least one porous surface, combustible particles building up upon said at least one porous surface as said exhaust gas streams flow through said at least one porous surface;

means disposed within said sealed housing in close proximity to said at least one porous surface for removing said combustible particles from said at least one porous surface while leaving a thin precoat of said combustible particles on said at least one porous surface; and,

means disposed within said sealed housing and in close proximity to said at least one porous surface and out of the flow path of said exhaust gas stream for burning said combustible particles as said combustible particles are removed from said at least one porous surface by said removing means.

4,874,408

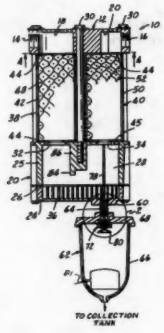
LIQUID DRAIN ASSEMBLY

Kenneth W. Overby, Hamilton, Ind., assignor to La-Man Corporation, Hamilton, Ind.

Continuation of Ser. No. 115,416, Nov. 2, 1987, abandoned. This application May 2, 1988, Ser. No. 188,638

Int. Cl.[4] B01D *19/00*

U.S. Cl. 55—218 **40 Claims**



1. A liquid drain assembly comprising

a liquid collection basin configured to receive a flow of compressed air and formed to include a sump, the liquid collection basin being formed to include aspirator means for temporarily accelerating a flow of compressed air in the liquid collection basin to produce a region of negative pressure in a throat passage defined by the aspirator means, the liquid collection basin also being formed to include means for passing the flow of compressed air received therein through the throat passage,

enclosure means for defining an enclosed volume configured to collect liquid drained from the sump,

means for conducting liquid from the sump formed in the liquid collection basin into the enclosed volume, the conducting means interconnecting the liquid collection basin and the enclosure means, and

means for drawing liquid into the enclosed volume through the conducting means in response to development of negative pressure in the throat passage of the aspirator means, the drawing means including an aspirator tube having an inlet opening and an outlet opening, the aspirator tube extending through the conducting means to position its inlet opening in the enclosed volume and its outlet opening above the crest of liquid in the sump, the aspirator tube being connected to the aspirator means to position the outlet opening of the aspirator tube in the throat passage so that air present in the enclosed volume is drawn into the aspirator tube in response to development of negative pressure in the throat passage to develop sufficient negative pressure in the enclosed volume to draw liquid collected in the sump into the enclosed volume through the conducting means.

4,874,409

EQUIPMENT FOR CONTINUOUS SEPARATION OF SMALL PARTICLES AND VAPOURS OF SUBLIMABLE COMPOUNDS

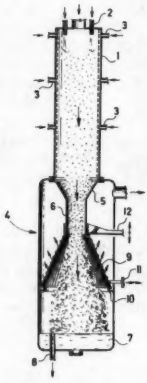
Jaroslav Vítovec; Jan Cermák, and Jirí Smolík, all of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Czechoslovakia

Filed Jan. 6, 1989, Ser. No. 294,288

Claims priority, application Czechoslovakia, Jan. 18, 1988, 332-88

Int. Cl.[4] B01D *59/08*

U.S. Cl. 55—267 **5 Claims**

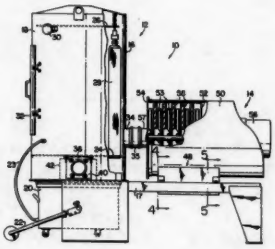


1. Equipment for continuous separation of small particles and vapours of subliming compounds at their separation from a mixture formed after desublimation of vapours of subliming compounds in a desublimer to which is attached a separator in whose upper part is situated a conical vessel, whose larger cross section forms the outlet throat of the separator and whose smaller cross section is equipped with an outlet throat while in the bottom part of the separator is located a well, which is equipped with a heating system and an outlet device, wherein between the outlet throat (6) and the well (7) is located a filter (9) of conical shape with angles of walls 10° to 45°, whose upper end is attached to the outlet throat (6).

4,874,410
VACUUM PRODUCING APPARATUS

James C. Poor, E. Granby, Conn., assignor to The Spencer Turbine Company, Windsor, Conn.

Filed Mar. 20, 1989, Ser. No. 325,790
Int. Cl.[4] B01D *46/00*
U.S. Cl. 55—276 16 Claims



1. In a vacuum producing apparatus including a bag separator having a generally cylindrical axially vertically extending housing, a lower bag head disposed within the housing and cooperating with the walls of the housing to define upper and lower chambers within the housing, an upper bag head disposed within the upper chamber above the lower bag head, a plurality of separator bags disposed within the upper chamber and supported by and extending between the upper and lower bag heads, the separator bags opening into the lower chamber, air inlet means for defining an airflow path into the lower chamber, air outlet means for defining an airflow path from said upper chamber, and exhausting means connected to said air outlet means for evacuating air from the upper chamber, the improvement comprising said air inlet means defining a radially inwardly directed airflow path, an expendable target plate, and means releasably supporting said target plate in depending relation to said lower bag head in the path of airflow into said lower chamber from said air inlet means.

4,874,411
AIR FILTERING MECHANISM

Paul E. M. Snauwaert, Curitiba, Brazil; Geert R. J. Vergote, Izegem, and Daniel C. Witdoek, Hooglede, all of Belgium, assignors to Ford New Holland, Inc., New Holland, Pa.

Filed Dec. 2, 1987, Ser. No. 127,996
Claims priority, application European Pat. Off., Dec. 5, 1986, 86.202.201.9
Int. Cl.[4] B01D *46/38*
U.S. Cl. 55—290 6 Claims

1. An air filtering mechanism for use on mobile equipment comprising:

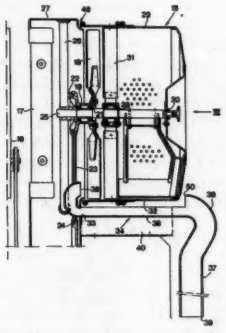
a perforate filter element having an external surface and being rotatably mounted on said mobile equipment;

drive means for rotatably moving said filter element during operation of said mobile equipment;

a fan operable to draw air through said filter element, said air bearing foreign matter which is restrained by said filter and retained on said external surface by the flow of air effected by said fan passing through said perforate filter element;

duct means provided adjacent said filter element, said duct means having an inlet adjacent the downstream pressure side of said fan so that filtered air flows through said duct means along said external surface of said filter element, said duct means further having an open portion directed towards said filter element adjacent said external surface, the duct means being operable to channel a cleaning air blast in a generally parallel direction relative to and closely adjacent said external surface so that the cleaning air blast through the duct means removes foreign matter collected on the filter element by virtue of the external surface of said filter element being exposed to said cleaning air blast in the duct means through the open portion thereof; and

a baffle provided closely adjacent the filter element along an internal surface thereof for blanking off the perforations

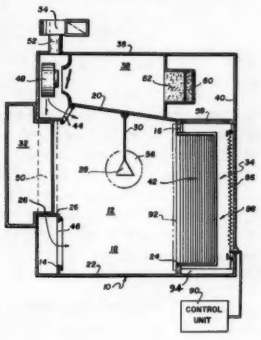


thereof over a predetermined region so as to obstruct the passage therethrough of air to be filtered, the baffle being stationary and being positioned directly opposite to said open portion of said duct means such that successive sections of the filter element are blanked off along the internal surface thereof by the baffle during rotation of said filter element.

4,874,412
PAINT SPRAY BOOTH AND FILTER THEREFOR

William C. Nowack, Twin Lakes, Wis., assignor to Richmond Bank, Richmond, Ill.

Filed Jun. 3, 1988, Ser. No. 202,789
Int. Cl.[4] B01D *50/00*
U.S. Cl. 55—385.1 23 Claims



1. A paint spray booth comprising a first wall means defining a work chamber adapted to receive objects to be painted and a second wall means adjacent to the first wall means defining a plenum chamber, said first wall means having an opening communicating with the plenum chamber and an aperture spaced from the opening communicating with the plenum chamber, said second wall means having an orifice communicating with the ambient atmosphere, a filter sealed in the opening, air circulation means in the plenum chamber for moving air through the filter into the plenum chamber, through the

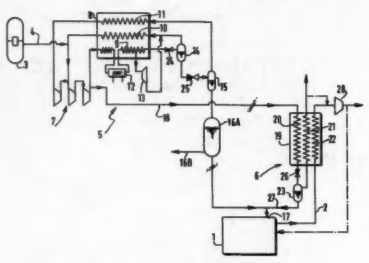
plenum chamber, dividing the flow of air to direct a portion thereof through the aperture back into the work chamber and a portion thereof through the orifice to the ambient atmosphere, wherein the filter is disposed in a plane and comprises a plurality of elongated members, each of said members having a first flat elongated portion with opposite edges and the axes of the first portions of the members being disposed parallel to each other in a common plane, each of said members having a second and a third flat portion extending from opposite edges of the first portion, the second portions being disposed in a second common plane parallel to the common plane of the axes of the first portions and spaced from each other to form openings therebetween for the passage of air, the third flat portions being spaced from each other and forming slots therebetween for the passage of air, the third portions directly confronting the work chamber and each slot having an area less than the area of the downstream opening, whereby air directed toward the filter passes through the slots and thereafter the openings.

4,874,413

PROCESS AND INSTALLATION FOR SUPPLYING NITROGEN TO AN APPARATUS

Jean-Yves Thonnelier, Sassenage, France, assignor to L'Air Liquide, Societe Anonyme Pour L'Etude et L'Exploitation des Procedes Georges Claude, Paris, France

Filed Jan. 11, 1988, Ser. No. 142,663
Claims priority, application France, Jan. 16, 1987, 87 00435
Int. Cl.[4] F25J *3/06*
U.S. Cl. 62—23 **16 Claims**



1. Process for supplying nitrogen to an apparatus which has a principal supply of liquid nitrogen and discharges gaseous nitrogen at low temperature and low pressure, said process comprising liquefying an additional nitrogen stream under high pressure by heat exchange with said gaseous nitrogen discharged by said apparatus, expanding the liquid thus obtained to a supply pressure of said apparatus, and adding the expanded liquid to said principal supply of liquid nitrogen of said apparatus.

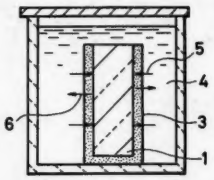
4,874,414

ION EXCHANGE PROCESSING METHOD OF GLASS

Yoshikazu Kaite, and Takashi Yamagishi, both of Hyogo, Japan, assignors to Nippon Sheet Glass Co., Ltd., Japan

Filed Sep. 23, 1988, Ser. No. 248,430
Int. Cl.[4] C03C *18/12, 21/00*
U.S. Cl. 65—20.13 **10 Claims**

1. An ion exchange processing method of glass, where a glass body and a media containing monovalent cation are contacted, thereby exchanging such cation with a monovalent cation contained in the glass body, characterized by having an essential surface of said glass body coated with an inorganic porous layer formed by drying and sintering a slurry or paste, which contains more than 3 weight % clay, and by carrying



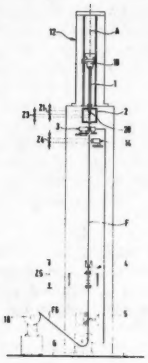
out the ion exchange through said porous layer and, thereafter removing said porous layer from the glass body.

4,874,415

METHOD OF MANUFACTURING A HIGH MECHANICAL STRENGTH OPTICAL FIBER BY DRAWING UNDER HIGH TENSION

Jean-Yves Boniort, Limours, and Jacques Leboucq, Sainte Genevieve Des Bois, both of France, assignors to Alcatel N.V., Amsterdam, Netherlands

Filed Dec. 9, 1988, Ser. No. 281,604
Claims priority, application France, Dec. 10, 1987, 87 17220
Int. Cl.[4] C03B *37/027;* C03C *25/02*
U.S. Cl. 65—3.11 **1 Claim**



1. A method of manufacturing an optical fiber by drawing, said method being intended to provide a fiber constituted by glass and surrounded by an organic protective coating, said fiber having an axis, a fiber outside radius, and a composition which is uniform along the lengthwise direction of the fiber and which follows an internal composition law inside the fiber relating the composition of each point of the fiber to the relative radius of the point, with the relative radius of any point being given by the radio of the measured distance between said point and the axis divided by the outside radius, said method comprising the following operations:

preparing a glass preform having the same internal composition law as the fiber to be made, but having an initial outside radius which is larger than said outside radius of the fiber;

continuous fiber-drawing, said fiber-drawing comprising the following operations:

heating a lengthwise end portion of said preform in order to soften it right through to constitute a visco-elastic mass (20);

applying sufficient longitudinal fiber-drawing tension to said visco-elastic mass to cause the glass thereof to be

drawn down in a drawing-down zone (Z1) with the outside radius of the mass of glass reducing progressively until said radius reaches said outside radius of the fiber, while said internal composition law is conserved such that the result of said operation is to constitute said fiber;

progressively cooling the glass from its surface in said drawing-room zne in such a manner that a sufficiently large fraction of the cross-section of said glass solidifies in a surface solidification zne (Z2) at the end of said drawing-down zone for said solidified fraction to withstand said fiber-drawing tension elastically once its outside radius reaches said outside radius of the fiber; and

further cooling the fiber obtained in this way in an additional cooling zone (Z3) in order to solidify the glass of the fiber completely;

said fiber-drawing opertion being followed, in a covering zone (Z5) downstream from said additional cooling zone, by a covering operation during which said protective covering is applied around the fiber resulting from said fiber-drawing in order to protect the surface thereof;

said fiber-drawing tension being applied to said visco-elastic mass (20) and to said fiber via said protective covering in a traction zone situated downstream from said covering zone;

said method being characterized by the fact that it further includes:

treatment consisting in a surface reheating operation under tension through an average thickness lying between 5 microns and 10 microns, said operation being performed during said fiber-drawing operation in a reheat zone (Z4) between said additional cooling zone and said covering zne, and in which the outside surface of the fiber (F) under a tension lying in the range 0.4N to 1.4N is heated sufficiently to cause a surface layer (28) of said fiber to soften, thereby eliminating any surface microcracks that may result from said fiber-drawing operation, with the duration of said reheating being sufficiently short to ensure that a majority axial fraction (30) of the cross-section of the fiber remains solid and withstands said fiber-drawing tension elastically; and

a second cooling operation in a second cooling zone between said reheating zone and said covering zone, thereby solidifying said surface layer while said majority axial fraction is still under tension for withstanding said fiber-drawing tension, such that said majority axial fraction retains a permanent residual tension downstream from said traction zone, thereby applying permanent longitudinal compression to said solidified surface layer.

4,874,416

BASE MATERIAL OF OPTICAL FIBERS AND A METHOD FOR THE PREPARATION THEREOF

Kiyoshi Yokokawa, and Kazuo Koya, both of Gunma, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 908,881, Sep. 15, 1986, abandoned, which is a division of Ser. No. 686,197, Dec. 26, 1984, abandoned. This application Apr. 25, 1988, Ser. No. 188,118

Claims priority, application Japan, Dec. 28, 1983, 58-251949

Int. Cl.[4] C03B *37/018*

U.S. Cl. 65—3.12 **2 Claims**

1. A method for the preparation of a glassy base material for optical fibers comprising a rod-shaped core portion, a first cladding layer on and surrounding the core portion and a second cladding layer formed of fused synthetic silica on and surrounding the first cladding layer integrally vitrified together which comprises the steps of:

(a) forming a soot preform as a rod-like soot deposit of silica particles for the core and first cladding layer by axial deposition of siliceous particles produced by the flame hydrolysis of a gaseous starting material containing a silicon compound onto a rotating target, as a growing rod soot preform;

(b) dehydrating and vitrifying the soot preform into a glassy rod of the core portion and the first cladding layer;

(c) forming a layer of silica soot deposit as a second cladding layer soot preform on and surrounding the glassy rod obtained from step (b) by the deposition of siliceous particles produced by the flame hydrolysis of a gaseous starting material containing a silicon compound;

(d) controlling the amount of soot deposition of the second cladding so that the thickness of the first cladding layer is in the range from 10 to 80 percent of the overall thickness of the total cladding layer after the second cladding layer is formed, the deposition control being effected by measuring the increase in weight of the rod as the second cladding is being formed using a load-measuring-means and controlling the degree of deposition of the second cladding in response to the measured increase in weight so as to provide said 10 to 80 percent of said overall thickness; and

(e) vitrifying the layer of the soot deposit to form the second cladding layer on and surrounding the glassy rod integrally.

4,874,417

METHOD OF PURIFYING VITREOUS SILICA

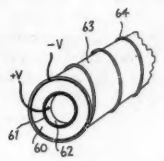
John A. Winterburn, Tynemouth, United Kingdom, assignor to Thermal Syndicate P.L.C., Wallsend, Tyne and Wear, England

Continuation of Ser. No. 897,636, Jul. 7, 1986, Pat. No. 4,759,787. This application Apr. 12, 1988, Ser. No. 180,440

Claims priority, application United Kingdom, Nov. 5, 1984, 8427915

Int. Cl.[4] C03B *15/00, 19/00;* **C03C** *23/00*

U.S. Cl. 65—111 **4 Claims**



1. In a method of improving the quality of a body of vitreous silica containing alkali metal ions selected from the group consisting of soidum ions, potassium ions and lithium ions and present as an impurity in the body, in which at least a major part of the concentration of at least one of said group of alkali metal ions in the body close to one boundary surface is made to migrate away from said one boundary surface of the body towards an opposite boundary surface thereof by applying a polarizing potential of between 10v/mm and 1000v/mm thickness across the boundary surfaces of the body while the body is maintained at an elevated temperature, the improvement of carrying out electrolysis at a temperature above 1000° C. by maintaining a polarizing potential of the same polarity across the boundary surface during cooling of the body at least until the temperature of the body is less than 800° C., whereby the concentration of said at least one alkali metal ion in the vitreous silica material adjacent to said one boundary surface is made less than 0.1 ppm.

4,874,418
BLOW BOX FOR GLASS TEMPERING

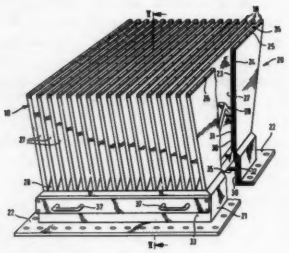
Hans-Werner Kuster, Aachen, Fed. Rep. of Germany; Herbert Radermacher, Raeren, and Luc Vanaschen, Eupen, both of Belgium, assignors to Saint-Gobain Vitrage "Les Miroirs", Courbevoie, France

Division of Ser. No. 39,026, Apr. 16, 1987, Pat. No. 4,816,058. This application Aug. 12, 1988, Ser. No. 231,390

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1986, 36127205

Int. Cl.[4] C03B *27/04*

U.S. Cl. 65—348 2 Claims



1. An apparatus for thermally tempering a pane or panes of glass, comprising: first and second oppositely situated and spaced-apart blow boxes and means for supplying air under pressure to each, each said below box comprising an air distribution box and a series of spaced-apart nozzle webs extending over the entire width of said air distribution box, each said nozzle web defined by opposed major side walls extending the length of said distribution box, an upper closure strip in which bore holes are provided, and frontal and rear plates attached to said side walls, said side walls bearing, on the opposed interior faces supports for a sealing rod which can be introduced through an opening in said frontal and rear plate,

a sealing rod for each nozzle web which may be inserted in said opening, and thereby occlude at least one bore hole in said closure strip, said sealing rods being supported against said closure strip by said support means so as to block the air supply to said occluded bores when inserted, and

means for supplying said panes to the space between said first and second blow boxes.

4,874,419
SUBSTRATE FOR GROWING SHIITAKE MUSHROOMS

Lung-chi Wu, Napoleon, Ohio, assignor to Campbell Soup Company, Camden, N.J.

Continuation of Ser. No. 750,152, Jul. 1, 1985, abandoned. This application Jan. 17, 1989, Ser. No. 298,319

Int. Cl.[4] C05F *11/08, 9/04, 11/02*

U.S. Cl. 71—5 8 Claims

1. A process for preparing a nutrient substrate composition suitable for growth of shiitake mushrooms consisting essentially of

preparing a nitrogen-containing compost mixture consisting essentially of a vegetative waste, a mineral fertilizer and water, said mixture having a moisture content of about 65° to 80%;

aerobically digesting the mixture at an ambient temperature range of between about 18° C. to 30° C. for between about 1 to 9 days;

pasteurizing the aerobically digested mixture; and

further digesting the pasteurized mixture at a mesothermic temperature of between about 45° to 55° C. for between about 3 to 5 days.

4,874,420
HERBICIDAL SUBSTITUTED TRIAZINES

Heinz-Jürgen Wroblowsky; Joachim Kluth; Klaus-Günther Tietjen, all of Langenfeld; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt, Bergisch-Gladbach, and Harry Strang, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

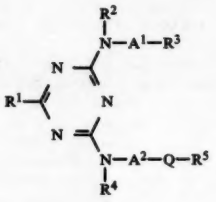
Filed Jul. 15, 1988, Ser. No. 220,036

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1987, 3724378; Jan. 16, 1988, 3801113

Int. Cl.[4] A01N *43/70;* C07D *251/50, 251/52, 251/18*

U.S. Cl. 71—93 8 Claims

1. A substituted triazine of the formula



(I)

in which

A^1 represents optionally branched and optionally phenyl-substituted alkanediyl with 1 to 4 carbon atoms,

A^2 represents optionally branched alkanediyl with 1 to 4 carbon atoms,

Q represents oxygen, sulphur, NH or N-(C_1–C_4-alkyl),

R^1 represents hydrogen, hydroxyl, nitro, cyano, cyanoamino, azido, fluorine, chlorine, bromine, iodine, C_1–C_4-alkoxy, C_1–C_4-alkylthio (which is optionally substituted by cyano, fluorine and/or chlorine), C_1–C_4-alkyl, C_1–C_4-alkoxy-carbonyl, aminocarbonyl, C_1–C_4-alkyl-amino-carbonyl, di-(C_1–C_4-alkyl)-amino-carbonyl, amino, C_1–C_4-alkylamino or di-(C_1–C_4-alkyl)-amino,

R^2 represents hydrogen, C_1–C_4-alkyl, C_2–C_4-alkenyl or C_2–C_4-alkinyl,

R^3 represents an aromatic or heteroaromatic radical from the group consisting of phenyl, naphthyl, pyridyl, quinolinyl, isoquinolinyl, pyrimidinyl, furyl, thienyl, pyrrolyl, pyrazolyl and imidazolyl which is optionally substituted by fluorine, chlorine, bromine, iodine, cyano, nitro, C_1–C_4-alkyl (which is optionally substituted by fluorine and/or chlorine), C_1–C_4-alkoxy or C_1–C_2-alkylenedioxy (which are optionally substituted by fluorine and/or chlorine), C_1–C_4-alkylthio, C_1–C_4-alkyl-sulphinyl or C_1–C_4-alkylsulphonyl (which are optionally substituted by fluorine and/or chlorine), di-(C_1–C_2-alkyl)-amino and/or by C_1–C_4-alkoxy-carbonyl,

R^4 represents hydrogen, C_1–C_4-alkyl, C_2–C_4-alkenyl or C_2–C_4-alkinyl and

R^5 represents hydrogen or C_1–C_4-alklyl.

5. A herbicidal composition comprising a herbicidally effective amount of a compound according to claim 1 and a diluent.

4,874,421
HERBICIDAL METHOD WITH IMPROVED CROP TOLERANCE

William A. Kleschick, Martinez; Jacob Secor, Walnut Creek, and Theodore W. Holmsen, Clayton, all of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 14, 1988, Ser. No. 206,537

Int. Cl.[4] A01N *43/40*

U.S. Cl. 71—9 H 9 Claims

1. A method of selectively controlling undesirable vegetation in rice crops which comprises contacting rice seeds or plants with a crop-protecting sub-phytotoxic, acetyl-coenzyme A carboxylase and thereafter, within the period during which the acetyl-coenzyme A carboxylase activity level in the rice

plants is elevated, contacting the rice plants and the locus thereof postemergently with an undesirable vegetation controlling amount of the same pyridinyloxyphenoxypropanoate herbicide.

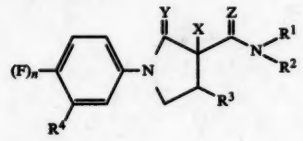
4,874,422

1-PHENYL-3-CARBOXYAMIDOPYRROLIDONES AND THEIR USE AS HERBICIDES

Frank X. Woolard, Richmond, Calif., assignor to ICI Americas Inc., Wilmington, Del.

Filed Dec. 27, 1988, Ser. No. 290,139
Int. Cl.[4] A01N *43/36, 43/40;* C07D *295/10, 213/50*
U.S. Cl. 71—95 63 Claims

1. A compound having the formula



in which:

R^1 is a member selected from the group consisting of H, C_1–C_6 alkyl, C_2–C_6 alkenyl, C_2–C_6 alkynyl, C_3–C_6 cycloalkyl, C_1–C_6 alkoxy, phenyl, halo-substituted phenyl, benzyl, halo-substituted benzyl, and C_1–C_6 alkyl substituted with one or more members selected from the group consisting of C_1–C_6 alkoxy, C_1–C_6 alkylthio, phenyl, hydroxyl and cyano, and

R^2 is a member selected from the group consisting of H and C_1–C_6 alkyl, or

R^1 and R^2 are combined to form a member selected from the group consisting of C_2–C_6 alkylene and C_2–C_6alkyleneoxyalkylene;

R^3 is a member selected from the group consisting of C_1–C_6 alkyl and C_2–C_6 alkenyl;

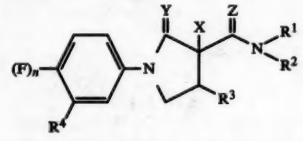
R^4 is a member selected from the group consisting of H, halogen, CH_3, CF_3, CF_2CHF_2, OCF_2CHF_2, $OCHF_2$, OCF_3, SCH_3, $S(O)CH_3$, SO_2CH_3, methoxyiminomethyl, methoxyimino-1-ethyl, benzyloxyiminomethyl, and benzyloxyimino-1-ethyl;

n is zero or 1:

X is a member selected from the group consisting of H and halogen;

Y is a member selected from the group consisting of O and S; and Z is a member selected from the group consisting of O and S.

43. A method of controlling undesirable vegetation comprising applying to said vegetation or to the locus thereof an herbicidally effective amount of a compound having the formula



in which:

R^1 is a member selected from the group consisting of H, C_1–C_6 alkyl, C_2–C_6 alkenyl, C_2–C_6 alkynyl, C_3–C_6 cycloalkyl, C_1–C_6 alkoxy, phenyl, halo-substituted phenyl, benzyl, halo-substituted benzyl, and C_1–C_6 alkyl substituted with one or more members selected from the group consisting of C_1–C_6 alkoxy, C_1–C_6 alkylthio, phenyl, hydroxyl and cyano, and

R^2 is a member selected from the group consisting of H and C_1–C_6 alkyl, or

R^1 and R^2 are combined to form a member selected from the group consisting of C_2–C_6 alkylene and C_2–C_6 alkyleneoxyalkylene;

R^3 is a member selected from the group consisting of C_1–C_6 alkyl and C_2–C_6 alkenyl;

R^4 is a member selected from the group consisting of H, halogen, CH_3, CF_3, CF_2CHF_2, OCF_2CHF_2, $OCHF_2$, OCF_3, SCH_3, $S(O)CH_3$, SO_2CH_3, methoxyiminomethyl, methoxyimino-1-ethyl, benzyloxyiminomethyl, and benzyloxyimino-1-ethyl;

n is zero or 1:

X is a member selected from the group consisting of H and halogen;

Y is a member selected from the group consisting of O and S; and

Z is a member selected from the group consisting of O and S.

4,874,423

SOLID, HERBICIDAL COMPLEXES

George T. Colegrove, San Diego, and Thomas A. Lindroth, Spring Valley, both of Calif., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 785,624, Oct. 8, 1985. This application Sep. 8, 1986, Ser. No. 904,322
Int. Cl.[4] A01N *43/36*
U.S. Cl. 71—95 4 Claims

1. A solid, herbicidal bipyridinium quaternary salt-/heteropolysaccharide complex comprising 14–55% (wt.) bipyridinium salt, calculated as cation, wherein the heteropolysaccharide in said complex is a low viscosity heteropolysaccharide, wherein said heteropolysaccharide is xanthan gum or S-194 having a 5% (wt.) aqueous solution viscosity of 15–300 cP or guar gum having a 5% (wt.) aqueous solution viscosity of 15–100 cP as measured on a Brookfield LVT viscometer, at 25° C., spindle 2, 60 rpm.

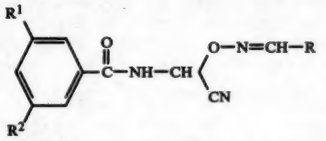
4,874,424

HERBICIDAL AGENTS

Klaus Jelich, Wuppertal; Herbert Gayer, Monheim; Wolfgang Krämer, Burscheid; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt, Bergisch Gladbach, and Harry Strang, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 27, 1988, Ser. No. 186,548
Claims priority, application Fed. Rep. of Germany, May 8, 1987, 3715248
Int. Cl.[4] A01N *37/34*
U.S. Cl. 71—105 5 Claims

1. A method of combating unwanted vegetation which comprises applying to such vegetation or to a locus from which it is desired to exclude such vegetation a herbicidally effective amount of an alkoximinoalkylamide of the formula



(I)

in which

R represents hydrogen, or represents straight-chain or branched alkyl with 1 to 4 carbon atoms,

R^1 represents hydrogen, fluorine, chlorine, bromine, iodine or nitro, or represents in each case straight-chain or branched halogenoalkyl with in each case 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, and

R^2 represents fluorine, chlorine, bromine, iodine, cyano or nitro, or represents in each case straight-chain or branched alkyl with in each case 1 to 4 carbon atoms, or

represents in each case straight-chain or branched halogenoalkyl, halogenoalkoxy or halogenoalkylthio with in each case 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms or represents alkoxycarbonyl with 1 to 5 carbon atoms.

4,874,425

STABLE AQUEOUS SUSPENSION CONCENTRATE COMPOSITIONS

Masaomi Kimpara, Hamamatsu; Kaiji Kawai, Toyohashi, and Yukiya Tobe, Kanagawa, all of Japan, assignors to American Cyanamid Company, Stamford, Conn.

Filed May 23, 1986, Ser. No. 887,108
Int. Cl.[4] A01N *33/04*
U.S. Cl. 71—121 **4 Claims**

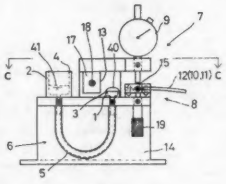
1. An aqueous flowable pesticidal concentrate composition comprising, on a weight to weight basis: about 10.0% to 60.0% pendimethalin, in the yellow microcrystalline form; about 1.0% to 10.0% sodium or calcium lignin sulfonate; about 0.05% to 0.5% thickening agent; about 0.1% to 1.0% antiseptic agent; about 0.05% to 1.0% montmorillonite; and the remainder water to total said composition to 100%.

4,874,426

SURFACE TENSIOMETER AND CONCENTRATION CONTROLLING DEVICE

Hajime Honda, 4-1-6, Yamato-cho, Nada-ku, Kobe-shi, Hyogo-ken, Japan

Filed Sep. 29, 1988, Ser. No. 250,671
Claims priority, application Japan, Sep. 29, 1987, 62-244600
Int. Cl.[4] G01N *13/02*
U.S. Cl. 73—64.4 **32 Claims**



1. A surface tensiometer comprising:

a measurement container (1) having an upper edge (3) on an upper end thereof opened on a horizontal plane perpendicular to an axis of said measurement container with its lower end communicating with an end of a connecting pipe (5);

an inlet container (2) having an upper edge (4) thereof opened on a plane perpendicular to its axis located at a position higher than the upper edge (3) of said measurement container (1) with an open bottom edge that communicates with the opposite end of the connecting pipe (5); and

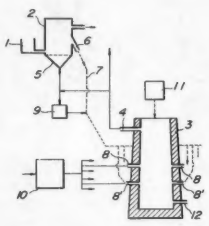
measuring means (7) for measuring a height of a highest position of a convex liquid surface statically formed on said upper end of said measurement container when in an equilibrium between an upward force exerted by a pressure difference in said inlet container relative to the liquid in said measurement container due to a height difference between a liquid surface of a liquid in said inlet container and said measurement container (1), with the height of the concave liquid surface being raised from the opened upper edge (3) of said measurement container (1) after the liquid introduced into said inlet container (2) reaches and overflows from said measurement container (1) and then reaches said equilibrium.

4,874,427

METHODS FOR MELTING AND REFINING A POWDERY ORE CONTAINING METAL OXIDES

Takao Hamada; Nobuo Tsuchiya; Toshihiro Inatani, all of Chiba; Eiji Katayama; Toshimitsu Koitabashi, both of Ichihara; Kyoji Okabe; Mitsuo Sumito, both of Chiba, and Yoshiyasu Takada, Chiba, all of Japan, assignors to Kawasaki Steel Corporation, Kobe City, Japan

Continuation of Ser. No. 646,028, Aug. 29, 1984, abandoned, which is a continuation of Ser. No. 371,677, Apr. 26, 1982, abandoned. This application Dec. 2, 1987, Ser. No. 127,600
Claims priority, application Japan, Apr. 28, 1981, 56-63294; May 8, 1981, 56-68110; May 21, 1981, 56-75639; Jul. 16, 1981, 56-111357
Int. Cl.[4] C21B *11/08*
U.S. Cl. 75—26 **7 Claims**



1. In a method for melting and refining a powdery or fine granular ore containing metal oxide comprising

(1) charging said ore and a reducing gas to a fluidized bed type of preliminary reducing furnace to preliminarily reduce said ore therein,

(2) charging the preliminarily reduced ore heated at a high temperature into a vertical melting and reducing furnace,

(3) introducing air or oxygen-enriched air at elevated temperature into said melting and reducing furnace so that said ore is melted and reduced therein by a carbonaceous solid reducing agent and air or oxygen-enriched air, and

(4) discharging molten metal and molten slag from the melting and reducing furnace,

the improvement which comprises

generating a reducing gas at elevated temperature in a vertical melting and reducing furnace containing a carbonaceous reducing agent and provided with upper and lower tuyeres,

blowing at least a part of said reducing gas, discharged from said melting and reducing furnace, into the preliminary reducing furnace to preliminarily reduce said ore therein, and

introducing the preliminarily reduced ore into said melting and reducing furnace via at least the upper of the tuyeres and introducing air or oxygen-enriched air via at least the lower of the tuyeres.

4,874,428

FLUIDIZING A LIME-SILICA SLAG

Joyce C. Niedringhaus, and Michael L. Lowry, both of Middletown, Ohio, assignors to Armco Inc., Middletown, Ohio

Filed Sep. 12, 1988, Ser. No. 242,981
Int. Cl.[4] C21C *7/02*
U.S. Cl. 75—30 **13 Claims**

1. A method of fluidizing a slag, comprising:

providing a lime-silica type slag covering a molten metal,

providing an acid flux containing a source of fluoride ion and complex sodium compound,

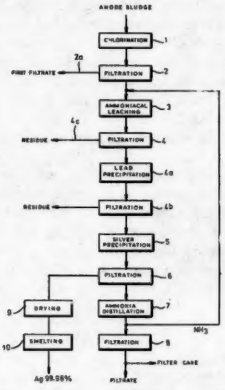
mixing said acid flux with said lime-silica slag to form a treated slag containing at least about 1% by weight F^- and at least about 1% by weight Na_2O,

whereby the melting point of said treated slag is below the melting point of said lime-silica slag,
removing said treated slag from said molten metal.

4,874,429
HYDROMETALLURGICAL PROCESS FOR THE RECOVERY OF SILVER FROM COPPER ELECTROLYSIS ANODE SLUDGE

Josef Bertha, Brixlegg, Austria, assignor to Austria Metall Aktiengesellschaft, Braunau am Inn, Austria

Filed Nov. 2, 1987, Ser. No. 116,595
Claims priority, application Austria, Oct. 31, 1986, 2906/86
The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.
Int. Cl.[4] C22B *11/04*
U.S. Cl. 75—118 R **6 Claims**



1. A hydrometallurgical process for the treatment of a copper-electrolysis anode sludge raw material which contains silver, lead and copper, and additionally one or more constituents selected from the group consisting of Au, platinum-group metals, Se, Te, Sb, Sn, As, Bi, Ni, Zn and Fe, sulfate ion, chloride ion and silica, comprising the steps of:

(a) slurrying said raw material with hydrochloric acid and introducing a sodium hypochlorite solution to the resulting slurry to generate nascent chlorine and chlorinate said raw material therewith;

(b) filtering said slurry to recover a first filtrate containing soluble chlorides of said constituents and a first solid filtered phase containing the silver of said raw material in the form of precipitated AgCl;

(c) extracting said first solid filtered phase with ammonia to recover an extract containing silver in solution in the form of $Ag(NH_3)_2Cl$ and dissolved lead;

(d) precipitating the lead from said extract and filtering same to form a second filtrate containing the $Ag(NH_3)_2Cl$;

(e) displacing silver from said second filtrate with at least one substance selected from the group consisting of Cu^I compounds, copper powder and bronze dust to precipitate a silver powder at a temperature of at least room temperature and with agitation, and increasing the volume of said silver powder by adding to said second filtrate a flocculating agent;

(f) filtering the second filtrate to recover a silver-powder precipitate and an ammoniacal third filtrate;

(g) reacting said third filtrate with calcium hydroxide to liberate ammonia, and distilling off the liberated ammonia to recover same while producing a suspension of a calcium salt;

(h) filtering said suspension to recover a filter cake; and

(i) smelting the silver-powder precipitated recovered in step (f) to obtain a product of enriched silver content relative to said silver-powder.

4,874,430
COMPOSITE SILVER BASE ELECTRICAL CONTACT MATERIAL

Norman S. Bornstein, West Hartford, Conn., assignor to Hamilton Standard Controls, Inc., Farmington, Conn.

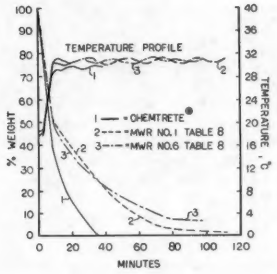
Division of Ser. No. 189,272, May 2, 1988, Pat. No. 4,834,939.
This application Jan. 23, 1989, Ser. No. 300,399
Int. Cl.[4] C22C *29/12*
U.S. Cl. 75—234 **4 Claims**

1. An electrical contact material consisting essentially of
4 to 15 wt. % cadmium oxide as dispersed particles
2 to 8 wt. % nickel, said nickel being present as discrete particles surrounded by nickel oxide, balance essentially silver.

4,874,431
LOW VOLATILITY WATER REPELLENTS

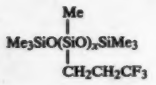
Kenneth C. Fey; Alan L. Freiberg, both of Midland, Mich., and John G. Price, South Glamorgan, United Kingdom, assignors to Dow Corning Corporation, Midland, Mich.

Filed Jul. 14, 1988, Ser. No. 218,781
Int. Cl.[4] C09K *3/19*
U.S. Cl. 106—2 **8 Claims**

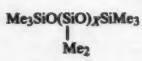


1. A method of reducing the volatility and decreasing the evaporation loss of water repellent compositions containing a solution of an alkylalkoxysilane with C_1 to C_6 alkyl groups on silicon, or a blend of alkylalkoxysilanes each having C_1 to C_6 alkyl groups on silicon, and a carrier selected from the group consisting of (i) alcohols, (ii) mineral spirits, and (iii) glycol ethers, for application to a porous substrate, comprising adding to the solution at least one metal salt catalyst, and adding to the solution an effective amount of surface depositing water beading agent, the surface depositing water beading agent being selected from the group consisting of:

a.



where X=10 to 100,
b. an amine salt functional siloxane copolymer,
c. trimethylsilyl endcapped polysilicate,
d.



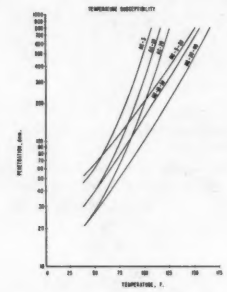
where x=0 to 800,
e. a room temperature curable silicone rubber, and
f. $(Me_3SiO)_4Si$.

4,874,432

MULTIGRADE ASPHALT CEMENT PRODUCT AND PROCESS

Anthony J. Kriech, and Herbert L. Wissel, both of Indianapolis, Ind., assignors to Asphalt Materials, Inc., Indianapolis, Ind.

Filed Jun. 27, 1988, Ser. No. 211,775
Int. Cl.[4] C08L *95/00*
U.S. Cl. 106—273.1 **49 Claims**



1. A process for producing gelled multigrade asphalt cement comprising:
a. liquefying an asphalt material that is substantially dry,
b. saponifying therein at least one fatty acid and at least one resin acid by reacting with at least a saponifiable amount of a substantially dry alkali metal base, and
c. removing the water of reaction to produce gelled multigrade asphalt cement.

4,874,433

METHODS OF PREPARING ENCAPSULATED PIGMENTS

Akos Kiss, Alzenau-Wasserlos; Peter Kleinschmit, Hanau; Juergen Hanich, Frankfurt; Guenter Halbritter, Rodenbach, and Jenny Horst, Gelnhausen, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jun. 3, 1988, Ser. No. 201,947
Claims priority, application Fed. Rep. of Germany, Jun. 6, 1987, 3719051
Int. Cl.[4] C08K *3/00*
U.S. Cl. 106—450 **5 Claims**

1. A method of preparing encapsulated pigments comprising a chromophoric or color-bearing substance which is encapsulated in a transparent casing compound of a substance stable against chemical attacks and glass stream vitrification, said method comprising binding the chromophoric substance or its initial components in and/or to a zeolite, followed by mixing with the encapsulating substance or its initial components and subsequently calcining at 500° C.

4,874,434

METHOD OF TREATING A TITANIUM STRUCTURE

Olen L. Riggs, Jr., Oklahoma City, Okla., assignor to Kerr-McGee Chemical Corporation, Oklahoma City, Okla.

Filed May 16, 1988, Ser. No. 194,644
Int. Cl.[4] C23G *1/10*; B08B *3/08*
U.S. Cl. 134—3 **4 Claims**

1. A method for treating a structure fabricated from a titanium base alloy composition consisting essentially of about 0.25 to about 1.5 weight percent of iron and about 0.1 to about 1.5 weight percent of copper, based on the weight of the composition, the balance being substantially all titanium apart from incidental impurities and where said titanium base alloy composition further is characterized by inherent properties of positive open circuit corrosion potentials and substantially reduced rates of corrosion, said method comprising:
providing an aqueous pickling solution comprising at least about 5 g/l of hydrofluoric acid and at least about 25 g/l of sulfuric acid;
contacting said aqueous solution with said fabricated structure; and
maintaining said aqueous solution, while in contact with said fabricated structure, at a temperature of at least about ambient temperature and continuing said contact at said temperature for a period ranging up to about 24 hours whereby upon discontinuing said contact, said inherent properties of the titanium base alloy composition from which the structure is fabricated are retained.

4,874,435

OZONIZATION OF CONTAINERS

Louis D. Caracciolo, 267A Hayesmill Rd., Atco, N.J. 08004

Filed Dec. 28, 1987, Ser. No. 138,349
Int. Cl.[4] A61L *2/00*; B08B *3/02, 3/08*
U.S. Cl. 134—22.18 **8 Claims**

1. A process for cleaning and sterilizing a wooden container comprising the step of spraying the interior surfaces of the wooden container with a stream of ozonated water under a pressure of at least about 1200 lbs/in^2 to result in penetration of the ozonated water beneath the surfaces, wherein the concentration of ozone in water is at least 0.2 ppm.

5. A process for cleaning and sterilizing wooden vessels comprising the step of spraying the inner surfaces of the vessels with a stream of ozonated water at a pressure which is sufficient to remove a veneer of wood from the surfaces which is at least one-sixteenth of an inch thick, wherein the concentration of ozone in water is at least 0.2 ppm.

4,874,436

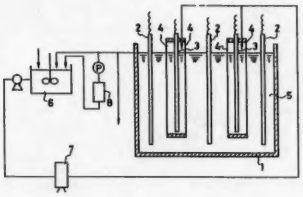
METHOD FOR PRODUCING HIGH PURITY ELECTROLYTIC COPPER

Takashi Ogata, Toda; Masanori Kato, Tokyo; Yoshio Kawasumi, Toda; Chikara Tominaga, Tokyo, and Kanji Tanaka, Ohita, all of Japan, assignors to Nippon Mining Co., Ltd., Tokyo, Japan

Division of Ser. No. 80,336, Jul. 30, 1987, Pat. No. 4,792,369. This application Aug. 26, 1988, Ser. No. 237,492
Claims priority, application Japan, Feb. 19, 1987, 62-34434; Jun. 26, 1987, 62-157565; Jun. 26, 1987, 62-157566
Int. Cl.[4] B22D *25/00*; C25C *1/12*
U.S. Cl. 148—2 **18 Claims**

1. A process for the electrolytic refining of electrolytic copper containing silver, as an impurity, whereby to obtain highly pure copper containing not more than 0.5 ppm of silver and not more than 0.5 ppm of sulfur, using an electrolytic cell comprising anode means made of electrolytic copper, cathode means on which said highly pure copper is deposited and a

nitric acid electrolytic solution, and in which diaphragm means is disposed between said anode means and said cathode means whereby the cell is divided into anode and cathode chamber means, which comprises the steps of: passing direct electrolysis current through said cell whereby said highly pure copper is deposited on said cathode means and silver is dissolved in the electrolytic solution in said anode chamber means, removing a portion of the silver-containing electrolytic solution from said



anode chamber means, contacting said silver-containing electrolytic solution with metallic copper in the presence of chlorine ions effective to precipitate silver, then filtering said silver-containing electrolytic solution through a filter having a pore diameter of 0.1 micron to 2 microns and thereby separating the precipitated silver from the remainder of said electrolytic solution and recirculating the remainder of said electrolytic solution to said cathode chamber means.

4,874,437

METHOD OF ADJUSTING HARDNESS OF METALLIC MATERIAL

Yoshihiko Masuda, Yokohama, and Masanobu Murakosi, Yokosuka, both of Japan, assignors to Kioritz Corporation, Tokyo, Japan

Filed Feb. 8, 1989, Ser. No. 307,545

Int. Cl.[4] C21D *2/00*

U.S. Cl. 148—150 **3 Claims**

1. A method of adjusting the hardness of a metallic material which is required to form tough and hard portions adjacent to each other, comprising the steps of:

induction-tempering both of said tough and hard portions which have been given a hardness required for said hard portion to a hardness required for said tough portion;

induction-hardening said hard portion alone to a hardness higher than that required for said hard portion; and

induction-tempering said hard portion alone to a hardness required for said hard portion.

4,874,438

INTERMETALLIC COMPOUND SEMICONDUCTOR THIN FILM AND METHOD OF MANUFACTURING SAME

Masahide Oshita; Masaaki Isai, both of Hamamatsu, and Toshiaki Fukunaka, Samukawa, all of Japan, assignors to Toyo Communication Equipment Co., Ltd., Japan

PCT No. PCT/JP87/00205, § 371 Date Nov. 30, 1987, § 102(e) Date Nov. 30, 1987

PCT Filed Apr. 1, 1987, Ser. No. 138,192

Claims priority, application Japan, Apr. 1, 1986, 61-75114; Mar. 20, 1987, 62-67292

Int. Cl.[4] H01L *43/08*

U.S. Cl. 148—400 **15 Claims**

1. A method for manufacturing an intermetallic compound semiconductor thin film comprising the steps of:

(a) providing an evaporation source containing a III–V Group intermetallic composition;

(b) providing a deposition substrate and raising the deposition substrate temperature to a first elevated level;

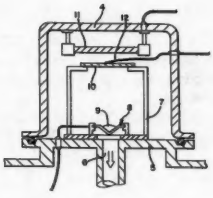
(c) maintaining said deposition substrate temperature at said first elevated level while gradually increasing the temperature of said evaporation source to vaporize said III–V Group intermetallic composition;

(d) passing vapors from said evaporation source to said deposition substrate;

(e) terminating the increase in temperature of the evaporation source when an early stage of the deposition of a thin film of III Group material occurs on the surface of said deposition substrate;

(f) maintaining the temperature of the evaporation source at the temperature where said early stage of film deposition occurs on the deposition substrate to begin deposition of a III–V Group intermetallic compound on said deposition substrate;

(g) lowering the temperature of said deposition substrate to a predetermined second elevated level of temperature below said first elevated level when formation of an initial



nucleus of III–V Group intermetallic compound begins on the surface of said deposition substrate; and

(h) maintaining said deposition substrate temperature at said predetermined second elevated level for a predetermined amount of time to produce a III–V Group intermetallic compound semiconductor thin film on the surface of said deposition substrate.

14. An intermetallic compound semiconductor thin film comprising a single crystal deposition film of In-Sb having a thickness of from about 0.15 to about 0.6μm, an electron mobility from about 10^4 to about 5×10^4 $cm^2/V.sec$, and a stoichiometric composition ratio of In to Sb of about 1:1.

15. An intermetallic compound semiconductor thin film comprising a single crystal deposition film of In-As having a thickness of from about 0.15 to about 0.6μm, an electron mobility from about 10^4 to about 5×10^4 $cm^2/V.sec$, and a stoichiometric composition ratio of In to As of about 1:1.

4,874,439

SYNCHRONIZER RING IN SPEED VARIATOR MADE OF WEAR-RESISTANT COPPER ALLOY HAVING HIGH STRENGTH AND TOUGHNESS

Hidetoshi Akutsu, Saitama, Japan, assignor to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 18, 1988, Ser. No. 157,634

Claims priority, application Japan, Feb. 24, 1987, 62-40661; Feb. 24, 1987, 62-40662; Aug. 25, 1987, 62-210671; Aug. 25, 1987, 62-210672; Aug. 25, 1987, 62-210673; Aug. 25, 1987, 62-210674; Aug. 25, 1987, 62-210675

Int. Cl.[4] C22C *9/00*

U.S. Cl. 148—433 **10 Claims**

7. A synchronizer ring made of a wear-resistant Cu alloy having high strength and toughness, said alloy consisting essentially of on a weight basis of 17–40% Zn, 2–11% Al, 0.5–6% Mn, 0.1–2% Si, 0.1–3% of at least one of Fe, Ni and Co, 0.003–3% of Mg, 30–1,000 ppm of oxygen, and at least one optional element selected from the group consisting of (i)

0–1% Cr and (ii) 0–2% of at least one of Pb and Sn, and the balance being Cu and incidental impurities, and having a struc-

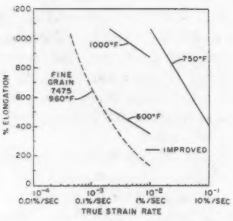
ture wherein intermetallic compounds and oxides are uniformly dispersed in a matrix.

4,874,440

SUPERPLASTIC ALUMINUM PRODUCTS AND ALLOYS

Ralph R. Sawtell, Lafayette, Calif.; Philip E. Bretz, and Craig L. Jensen, both of Plum, Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 841,648, Mar. 20, 1986, Pat. No. 4,689,090. This application Aug. 14, 1987, Ser. No. 85,851
Int. Cl.[4] C22F *1/04*
U.S. Cl. 148—437 **66 Claims**



1. A superplastically formed article of manufacture comprising a superplastically formed aluminum alloy comprising more than 50% aluminum and including some amount of up to 10% each of one or more elements from the group of yttrium, gadolinium, holminum, dysprosium, erbium, ytterbium, lutetium, and terbium, the grand total of said elements not exceeding 20%.

4,874,441

EXPLOSIVE FOR WARHEADS AND SOLID ROCKET PROPELLANT

Vinzenz Bankhamer, Eugendorf, and Gerhard Zeman, Hallein, both of Austria, assignors to Advanced Explosives Gesellschaft b.R., Hallein, Austria

Filed Dec. 28, 1988, Ser. No. 291,010
Claims priority, application Austria, Jan. 5, 1988, 13/88
Int. Cl.[4] C06G *33/06*
U.S. Cl. 149—42 **10 Claims**

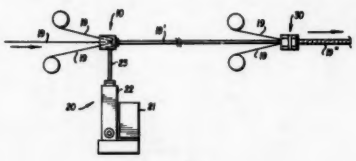
1. An explosive for warheads and solid rocket propellant, comprising a high-energy secondary explosive with an inorganic perchlorate and metal component with a high level of affinity for oxygen as well as desensitising and binding agents, characterised in that, in said secondary explosive, the oxygen balance sheet is balanced by the perchlorate component which is present in a substantially stoichiometric amount relative to said explosive to approximately give a complete reaction to form carbon dioxide and water.

4,874,442

METHOD FOR APPLYING STRAND FILLING COMPOUND

Clinton E. Watkins, and Bobby A. Rowland, both of Carroll County, Ga., assignors to Southwire Company, Carrollton, Ga.

Filed Sep. 1, 1987, Ser. No. 91,810
Int. Cl.[4] H01B *13/14*
U.S. Cl. 156—48 **11 Claims**



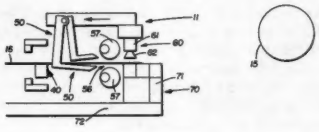
1. Method for application of moisture blocking compound to the interstitial spaces of a stranded conductor, comprising:
feeding a plurality of electrical wires into a cone die;
applying a moisture blocking compound to the individual strands of wire;
passing said plurality of strands of wire and said moisture blocking compound through an exit die;
loosely stranding said plurality of wires together;
passing said loosely stranded conductor through closing blocks; and
collecting said stranded conductor.

4,874,443

METHOD FOR APPLYING ELASTOMERIC MATERIAL ONTO A DRUM

Kent K. Kipling, Solon, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 424,736, Sep. 27, 1982, abandoned. This application Oct. 16, 1987, Ser. No. 110,594
Int. Cl.[4] B29H *15/04*
U.S. Cl. 156—64 **4 Claims**



1. A method for use in a system employing a plurality of drums having varying circumferences for applying a length of elastomeric material from a continuous length of said elastomeric material to a selected one of said drums, comprising the steps of:
(a) transporting a first end of said elastomeric material in a forwardly generally horizontal direction to the selected drum;
(b) moving said first end of said elastomeric material in a generally vertical direction and into contact with said drum for attaching said first end to said drum;
(c) rotating said drum to cause said elastomeric material to wrap partially around said drum;
(d) measuring the angular displacement of said drum and providing an output thereof;
(e) calculating the length of elastomeric material required to completely wrap around the drum based upon the measured angular displacement of said drum;
(f) cutting a portion of the elastomeric material from the continuous length thereof to form a second end in response to the calculated length required to wrap around

said drum which length is shorter than the circumference of the smallest drum in the system;

(g) transporting the second end in a generally horizontal direction away from said drum to stretch said cut portion of elastomeric material in order to abut the first end when said portion is completely wrapped about said drum;

(h) rotating the drum to completely wrap said stretched cut portion about said drum; and

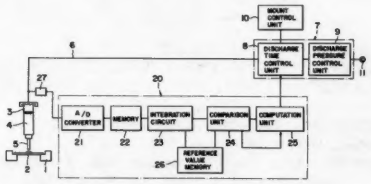
(i) centering the cut portion of elastomeric material with respect to the drum after the first end has been attached to said drum and prior to said cut portion being completely wrapped about said drum.

4,874,444

DIE-BONDING METHOD AND APPARATUS THEREFOR

Takeo Satou, and Yasuhiko Shimizu, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 19, 1988, Ser. No. 145,320
Claims priority, application Japan, Jan. 19, 1987, 62-9578
Int. Cl.[4] B65D *83/14*
U.S. Cl. 156—64 **24 Claims**



1. A die-bonding method for applying high pressure air to a resin vessel under a predetermined discharge condition to thereby discharge resin onto a portion subject to bonding, thus to adhesively join or connect a semiconductor chip to said portion subject to bonding by said resin discharged, said method including:

a process of detecting a pressure waveform applied to said resin vessel; and

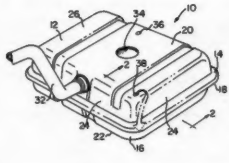
a process of controlling said discharge condition to compensate a difference between a pressure waveform detected and a predetermined reference pressure waveform so that a predetermined resin quantity is discharged at all times even when the quantity of the resin within said resin vessel varies.

4,874,445

METHOD FOR REPAIRING FUEL TANKS

Patrick J. Lavoie, Lakefield, Canada, assignor to Gas Tank Renu - USA, Detroit, Mich.

Filed May 3, 1988, Ser. No. 189,669
Int. Cl.[4] B32B *35/00*
U.S. Cl. 156—64 **11 Claims**



1. A method for repairing a fuel tank having an outer surface and an inner surface comprising the steps of:

eliminating all fuel from said tank;

removing tar and rust from said inner and outer surfaces;

covering leakage holes in said tank with a sealing material;

coating at least one of said outer and said inner surfaces with a plastisol compound; and

bonding said plastisol compound to said tank by heating said plastisol compound to a predetermined temperature of at least 350° F., for a predetermined time.

4,874,446

METHOD OF MAKING A JEWELRY DISPLAY CARD

Elkin, Alfred A., Pawtucket, R.I., and Sylvestre M. Costa, Seekonk, Mass., assignors to Plastic Development, Inc., Pawtucket, R.I.

Filed Jun. 20, 1988, Ser. No. 208,977
Int. Cl.[4] B32B *31/20*; A45C *11/16*
U.S. Cl. 156—66 **4 Claims**

1. A method of making a jewelry display card comprising:

(a) assembling an elongated plastic hanger member on the rear side of a substantially flat plastic card member, said hanger member being of generally U-shaped sectional configuration and including an elongated, substantially flat front flange portion having an upper end, an upper portion which extends rearwardly from the upper end of said flange portion and a rear portion which extends downwardly from said upper portion;

(b) welding the flange portion of said hanger member to the rear side of said card member so that said hanger member is spaced inwardly from the perimeter of said card member by at least approximately one-sixteenth of an inch;

(c) thereafter overlaying a foam pad on the front side of said card member;

(d) overlaying a flexible plastic sheet on said foam pad; and

(e) welding said plastic sheet to secure said plastic sheets to said card member around substantially the entire perimeter of said card member.

4,874,447

MELT BLOWN NONWOVEN WEB FROM FIBER COMPRISING AN ELASTOMER

Donald R. Hazelton, Chatham, N.J., and William J. Hodgson, Jr., Baytown, Tex., assignors to Exxon Chemical Patents, Inc., Linden, N.J.

Division of Ser. No. 6,867, Jan. 27, 1987, Pat. No. 4,804,577.
This application Nov. 17, 1988, Ser. No. 272,581
Int. Cl.[4] D04H *3/16*
U.S. Cl. 156—167 **14 Claims**

1. A method of preparing a nonwoven web comprising

(a) forming a polymeric blend comprising (i) from 5 to 75 wt % of an elastomeric copolymer of an isoolefin and a conjugated diolefin and (ii) from 25 to 95 wt % of a thermoplastic olefin polymer resin.

(b) heating the blend to form a melt;

(c) extruding the melt through die openings to form a row of fibers while blowing hot gases on both sides thereof to draw down the fibers and substantially reduce their diameters; and

(d) collecting the fibers to form a web.

4,874,448

METHOD OF MAKING SEAT-LIKE OBJECT

Muneharu Urai, Tokyo, Japan, assignor to Tachi-S Co., Ltd., Tokyo, Japan

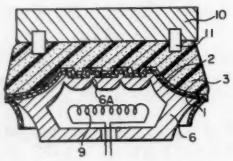
Continuation-in-part of Ser. No. 883,992, Jul. 10, 1986, abandoned. This application May 9, 1988, Ser. No. 195,479
Int. Cl.[4] B29C *51/14*; B65G *7/00*
U.S. Cl. 156—196 **5 Claims**

1. A method of making a seat-like object comprising the steps of:

(a) sandwiching and heating a gas permeable surface layer between upper and lower molds with three-dimensional projections having the same shape as an outer shape of a

porous cushion body to give the surface layer the same shape as the cushion body;

(b) preheating said cushion body by filling with hot air, thereby raising the temperature of the cushion body before being stuck together with the surface layer; and



(c) putting and heating a weld sheet between the preshaped surface layer and the preheated cushion body, thereby causing the weld sheet to melt and stick the surface layer and the cushion body together, the melting of the weld sheet being carried out so as to allow the air to pass through the combined product formed from the surface layer and the cushion body after the weld sheet is melted.

4,874,449

PROCESS FOR DRESSING A SUBSTANTIALLY FLAT SUBSTRATE SUCH AS SPLIT LEATHER OR A TEXTILE MATERIAL

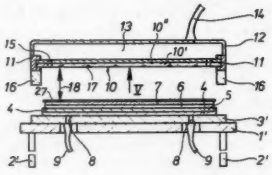
Philipp Schaefer, Oberstrasse 16, D-3000 Hannover 1, Fed. Rep. of Germany, and Helmut Schaefer, Avellino, Italy, assignors to Philipp Schaefer, Hannover, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 800,609, Nov. 21, 1985, abandoned, which is a division of Ser. No. 577,154, Feb. 6, 1984, Pat. No. 4,581,261. This application Dec. 22, 1987, Ser. No. 136,711

Claims priority, application European Pat. Off., Aug. 4, 1983, 83 89 0127.0

Int. Cl.[4] B29D *7/01;* **B32B** *31/26, 31/28*

U.S. Cl. 156—246 **57 Claims**



1. A process for forming a dressing on a substantially flat substrate having on at least one side a rough surface with fibers protruding therefrom, such as split leather or a textile material having on at least one side a split-leather-like appearance, the process comprising the steps of sequentially:

heating a support member having an upper side consisting of silicone rubber having antiadhesive properties and formed with small recesses for transmitting a pattern to said dressing;

applying a first aqueous dispersion of synthetic plastics material onto the upper side of the heated support member for forming a layer of the aqueous dispersion which, as a result of the heat of the support member, forms a cohesive solidified first layer of the dressing having a thickness between 0.07 mm and 0.22 mm;

further heating this support member from a bottom side opposite the upper side of the support member at least until the solidification of the first layer is complete;

applying a second aqueous dispersion of synthetic plastics material onto the solidified first layer;

placing the substrate with its rough surface onto the solidified first layer while the applied second dispersion of synthetic plastics material is still in a wet stage, whereby the fibers of the rough surface are immersed in the wet second dispersion;

heating the support member from the bottom side together with the solidified first layer, with the second aqueous dispersion, and with the substrate to a temperature of at least 85° C. so the second dispersion solidifies to form a second layer and applying a pressure onto an upper side of the substrate opposite the rough surface by means of a laminar, yielding pressing element during a time interval of at

heating the support member from the bottom side together with the solidified first layer, with the aqueous dispersion, and with the substrate to a temperature of at least 85° C. so the second dispersion solidifies to form a second layer and applying a pressure onto the upper side of the substrate opposite the rough surface by means of a laminar yielding pressing element during a time interval of at least 10 seconds, whereby vapor generated during the solidification of the second layer is at least partially removed via the substrate; and

removing from the support member the substrate provided with the dressing formed by the solidified first and second layers.

4,874,450

LAMINATING TRANSPARENT OR TRANSLUCENT MATERIALS USING IONIC DYE-COUNTER ION COMPLEXES

Peter Gottschalk, Centerville, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Continuation of Ser. No. 8,709, Jan. 29, 1987, abandoned. This application Jul. 11, 1988, Ser. No. 220,363

Int. Cl.[4] B32B *33/00*

U.S. Cl. 156—275.5 **24 Claims**

1. A process for laminating a transparent or translucent substrate which comprises the steps of:

coating a photohardenable composition on one surface of a first substrate, said photohardenable composition comprising a free radical addition polymerizable or crosslinkable compound and a dye-reactive counter ion complex, said complex being capable of absorbing actinic radiation and producing free radicals which initiate free radical polymerization or crosslinking of said compound and being a stable non-transcient compound prior to actinic radiation,

applying a second substrate to said photohardenable composition to form a laminate in which said photohardenable composition is interposed between said first and said second substrate, and

exposing said laminate to actinic radiation; at least one of said substrates being transparent or translucent.

4,874,451

METHOD OF FORMING A DISPOSABLE DIAPER WITH CONTINUOUS/INTERMITTENT ROWS OF ADHESIVE

Bentley J. Boger, Atlanta, and Peter J. Petrecca, Dunwoody, both of Ga., assignors to Nordson Corporation, Westlake, Ohio

Continuation-in-part of Ser. No. 55,656, May 29, 1987, abandoned, which is a division of Ser. No. 841,587, Mar. 20, 1986, Pat. No. 4,687,137. This application Jul. 8, 1988, Ser. No. 216,766

Int. Cl.[4] B32B *31/08, 31/12*

U.S. Cl. 156—291 **6 Claims**

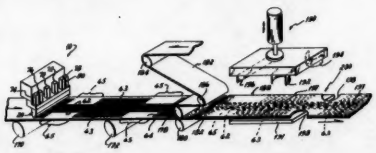
1. A method of manufacturing disposable diapers comprising:

passing a surface of a backing sheet portion of a disposable diaper beneath an adhesive dispenser connected to a source of molten thermoplastic material, said adhesive dispenser having first discharge orifices and second discharge orifices;

continuously dispensing multiple, parallel rows of molten

thermoplastic adhesive from said first discharge orifices of said adhesive dispenser onto a center portion of the backing sheet;

intermittently dispensing multiple, parallel rows of molten thermoplastic adhesive from said second discharge orifices of said adhesive dispenser onto outer portions of the backing sheet on either side of the center portion to form



spaced areas on the outer portions of the backing sheet with no adhesive;

adhering a non-woven layer portion of the disposable diaper to the backing sheet;

removing said spaced areas without adhesive from the outer portions of the backing sheet between said intermittent rows of adhesive to form the leg holes of the disposable diaper.

4,874,452

ARTICLES OF MANUFACTURE AND THEIR PRODUCTION

Gregory A. Ferro, Hoffman Estates, Ill., assignor to Imi-Tech Corporation, Elk Grove Village, Ill.

Filed Oct. 24, 1988, Ser. No. 261,124
Int. Cl.[4] C09J *5/02*
U.S. Cl. 156—308.6 **35 Claims**

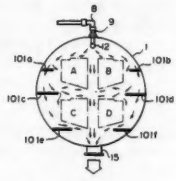
1. A process forming a recurable article which comprises compressing and heat curing while interposed between a plurality of substrates a non-resilient, non-flexible recurable material formed by subjecting cured polyimide foam to the action of pressurized steam.

4,874,453

APPARATUS AND METHOD FOR PLASMA TREATMENT OF RESIN MATERIAL

Kenji Fukuta; Takaoki Kaneko, and Yoshinobu Takahashi, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Division of Ser. No. 772,208, Sep. 5, 1985, Pat. No. 4,595,570, which is a continuation of Ser. No. 583,181, Feb. 24, 1985, abandoned. This application Jan. 8, 1986, Ser. No. 817,115
Claims priority, application Japan, Feb. 25, 1983, 58-29371; Feb. 25, 1983, 58-29372; Mar. 10, 1983, 58-38204
Int. Cl.[4] B01J *19/08*
U.S. Cl. 156—345 **1 Claim**



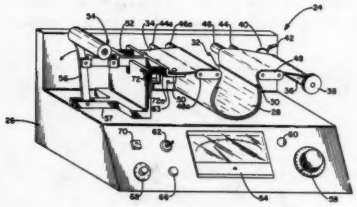
1. An apparatus for plasma treatment, capable of plasma-treating a plurality of works of resin material by irradiating the surfaces of the works with a microwave discharge plasma within a vacuum reaction chamber having an inner wall, comprising a plasma introducing port formed in the wall of the reaction chamber, a plasma-irradiating pipe connected to the plasma introducing port, said plasma-irradiating pipe being provided with a number of nozzle holes for injecting the plasma into the reaction chamber to form a flow of plasma and to irradiate therewith the surfaces of the works, a discharge port formed in the wall of the reaction chamber to reduce the internal pressure of the reaction chamber, a plurality of deflecting plates projecting from the inner wall of the reaction chamber toward the works centrally disposed within the interior of the reaction chamber, said plurality of deflecting plates being inclined toward the flow of plasma so as to diffuse said flow of plasma toward the works so that a substantially uniform distribution of plasma is provided on the works.

4,874,454

DECAL TRANSFER DEVICE

Anselm Talalay, Cleveland, and Herbert H. Borsvold, Akron, both of Ohio, assignors to Roger Laudy and U.S. Printcraft, both of Copley, Ohio

Filed Apr. 24, 1987, Ser. No. 42,053
Int. Cl.[4] H05B *1/00*; B44C *1/17*; B32B *31/00*
U.S. Cl. 156—359 **5 Claims**



1. A printing device for accomplishing sublimation design transfers through the use of heat and pressure which includes a flexible transfer head comprising:

a flexible heating pad structure adapted for deformation about a sublimation design accepting, curvilinear substrate to provide heat and pressure to a sublimation design during deformation, and

heating pad deformation means, wherein said heating pad structure comprises a laminate structure which includes a thin flexible heated sheet and a pad support belt, said structure being disposed in a loop configuration formed between two spaced heating pad structure supports which are stationary during said deformation, wherein said heating pad deformation means comprises means for tightening said loop about said substrate, wherein the curvilinear substrate comprises a substantially cylindrically shaped substrate, while said stationary, spaced heating pad structure supports comprise support members spaced apart from each other at a distance less than the diameter of said cylindrically shaped substrate, and said structure covers more than 180 degrees of the cylindrically substrate's surface, and wherein means are provided for adjusting the size of the loop prior to tightening said tightening means about said cylindrically shaped substrate.

4,874,455

APPARATUS FOR FORMING ENDLESS TIRE REINFORCING BELTS

David J. Ginter, Clinton, Conn., assignor to The Armstrong Rubber Co., New Haven, Conn.

Filed Jan. 29, 1987, Ser. No. 8,623
Int. Cl.[4] B65H *81/08*
U.S. Cl. 156—397 **9 Claims**

1. Apparatus for weaving a woven endless tire reinforcing belt for a single pneumatic tire from at least one coated continuous cord reinforcement laid on an endless weaving surface by reciprocating a reinforcement guide means while rotating said surface to lay said cord reinforcement on said surface in a

zig-zag pattern across said belt from one side to the other of said belt, said apparatus comprising:

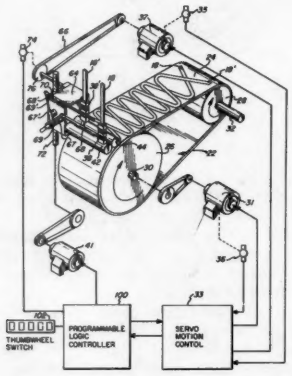
(a) means for reading and storing information representative of said zig-zag pattern for first and second belt portions 1 and 2 forming said belt within the same tire, including the widths W_1 and W_2 of each portion; the cord angles A_1 and A_2 of each said portion; and the number of traverses GR_1 and GR_2 of each said portion respectively;

(b) computer means for generating signals to control the weaving of said belt as represented by said information by first wearing said first belt portion of GR_1 traverses having width W_1 and cord angle A_1 and thereafter weaving said second belt portion of GR_2 traverses having width W_2 and cord angle A_2 on the radially outward side of said first portion;

(c) first servomotor means for rotating said weaving surface, said first servomotor means being responsive to control signals generated by said computer means to rotate said weaving surface at an angular velocity controlled by said computer means;

(d) first encoder means to provide a weaving surface angular velocity feedback signal to said computer means;

(e) second servomotor means operatively connected to said guide means for reciprocating said guide means;



(f) second encoder means operatively connected to said second servomotor means for monitoring the reciprocation of said guide means to provide a reciprocation feedback signal to said computer means, said computer means also for comparing said weaving surface angular velocity feedback signal and said reciprocation feedback signal with the cord angle of the belt portion being woven and generating a control signal to said reciprocation means to weave said belt portion having a corresponding gear ratio;

(g) stepper motor means operatively connected to said guide means for adjusting the amplitude of reciprocation of said guide means to thereby adjust the width of the belt portion being laid by said reciprocating means, said stepper motor means being responsive to control signals from said computer means to adjust said amplitude to first weave a belt portion of width W_1 and thereafter weave a belt portion of width W_2; and

(h) third encoder means operatively connected to said guide means for counting the number of reciprocations of said guide means, said third encoder means being operatively connected to said computer means, said computer means for generating signals to said stepper motor means, said first servomotor means, and said second servomotor means to begin the weaving of said second belt portion when the number of traverses counted by said third encoder means is GR_1.

4,874,456

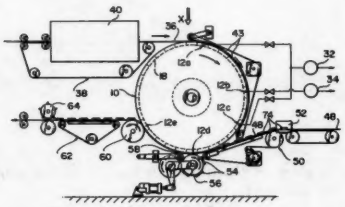
VACUUM DRUM APPARATUS FOR PROVIDING SANITARY ARTICLES

Katsumasa Takagi, Yokohama, Japan, assignor to Koyo Disposable Goods Company, Japan

Filed May 19, 1988, Ser. No. 196,622

Int. Cl.[4] B29C *51/10, 51/22, 51/36, 51/42*

U.S. Cl. 156—471 **17 Claims**



1. An apparatus for producing sanitary articles having absorptive pads for bodily fluids encased between a body contacting sheet of fluid permeable material and a covering sheet of fluid impermeable material, said apparatus comprising:

heating means for heating the fluid impermeable sheet to a temperature where it is deformable;

a drum including a stationary flange having vacuum source port means and a rotary drum portion and a plurality of dies with open cavities facing outward provided on the circumferential surface of the rotary drum member, each of said cavities providing a forming surface therein;

a plurality of pins, provided on opposite sides of the circumferential surface of said rotary drum member, for impaling and holding in place the edges of the strip of fluid impermeable material;

first transfer means for feeding the strip of fluid impermeable sheet onto the rotating surface of said rotary drum member;

vacuum means communicating with said vacuum source port means and for applying a relatively low degree of vacuum and, in sequence, a relatively high degree of vacuum to each cavity to force the heated impermeable sheet into each cavity, against the forming surface therein, and to thereby form pockets in said impermeable sheet;

means for placing a plurality of the absorptive pads along a length of a strip of the fluid permeable sheet material with equal spacing between the pads;

second transfer means for feeding a strip of the fluid permeable sheet material into contact with the rotating drum with the pads resting on the fluid permeable sheet coming into registration with said die cavities so that one pad is placed within each pocket formed within the strip of fluid impermeable material;

sealing means for sealing said strip of fluid impermeable material to said strip of fluid permeable material around the periphery of each of the absorptive pads; and

severing means for separating the assembled strips between adjacent absorptive pads to form the sanitary articles.

4,874,457

WEB CORRUGATING APPARATUS

Morris K. Swieringa, Lahaska, Pa., assignor to McNeil-PC, Inc., Milltown, N.J.

Filed Apr. 21, 1988, Ser. No. 184,516

Int. Cl.[4] B31F *1/34*

U.S. Cl. 156—474 **14 Claims**

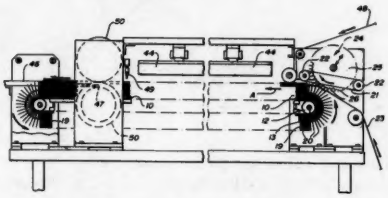
1. An apparatus for corrugating a web made of at least partially heat softenable fibers, said web having a length and transverse width, as said web moves in a direction parallel to said length, comprising:

(a) at least one first support means comprising a first paddle

having an edge which extends transverse to the direction of movement of said web, to movably support said web at a first location;

(b) at least one second support means comprising a second paddle having an edge, which extends transverse to the direction of movement of said web, to movably support said web at a second location spaced longitudinally along said web from said first location;

(c) a first endless drive means having said first paddle fixed thereto to extend radially outward therefrom, a second endless drive means having said second paddle fixed thereto to extend radially outward therefrom, said drive



means movable in a direction parallel to the direction of movement of said web along a path which is arcuate along first portion and substantially straight along a second portion such that said web is supported at said first and second locations by said first and second paddles and the separation between said first and second locations is closed to fold a web portion extending therebetween as said first and second paddles move to said second portion of said path; and

(d) heating means to heat said web after said separation has been closed to soften and bond fibers of adjacent folds of the web together prior to removal of said corrugated web from said paddles.

4,874,458

SINGLE CRYSTAL GROWING METHOD HAVING IMPROVED MELT CONTROL

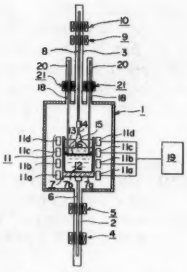
Minoru Nishizawa, Tokyo, Japan, assignor to Gakei Electric Works Co., Ltd., Tokyo, Japan

Filed Nov. 27, 1984, Ser. No. 675,409

Claims priority, application Japan, Aug. 31, 1984, 59-182435; Aug. 31, 1984, 59-182436; Aug. 31, 1984, 59-182437

Int. Cl.[4] C30B *15/24*

U.S. Cl. 156—607 **5 Claims**



1. A method of growing a single crystal comprising pulling a single crystal from a feed melt contained in a crucible under a high pressure inert gas atmosphere, covering the surface of the feed melt with a liquid sealing agent, floating an unperforated baffle plate having an outside diameter somewhat smaller than the inside diameter of the crucible in a predetermined position below the surface of the feed melt to define a spacing between the baffle plate and the surface of the feed melt and to define a gap between outside and inner peripheries of the baffle plate and the crucible, respectively, controlling the spacing between said baffle plate and the surface of the feed melt so that said spacing is maintained at a predetermined spacing during pulling of the single crystal, causing relative rotation between the baffle plate and the crucible, the periphery of the baffle plate including a feed melt guiding portion which causes movement of the feed melt from below the baffle plate smoothly upward through the gap between the relatively rotating baffle plate and the crucible to a solid-melt interface region above the baffle plate, heating discrete vertically spaced points in the feed melt preselectedly and controlling the heat applied to said discrete vertically spaced points in the feed melt.

4,874,459

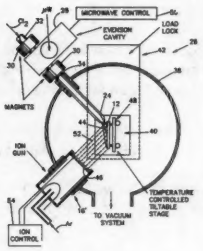
LOW DAMAGE-PRODUCING, ANISOTROPIC, CHEMICALLY ENHANCED ETCHING METHOD AND APPARATUS

Larry A. Coldren, Santa Barbara, and Jay A. Skidmore, Goleta, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Oct. 17, 1988, Ser. No. 258,646

Int. Cl.[4] H01L *21/306*; B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—643 **40 Claims**



32. The method of operating low damage-producing, anisotropic, chemically enhanced etching apparatus comprising the steps of:

(a) providing an evacuated chamber into which a substrate to be etched can be placed;

(b) providing a temperature controlled tiltable stage in the chamber for receiving and holding the substrate at a proper angle for etching;

(c) connecting an input into a microwave cavity to a supply of molecular chlorine for selectively exciting and disassociating molecular chlorine;

(d) connecting an outlet from the microwave cavity to be conducted and discharged close adjacent and against the stage;

(e) connecting first control means to the microwave cavity for controlling the flow of excited chlorine radicals being emitted from the microwave cavity;

(f) providing an ion gun producing a beam of Ar^+ ions and directing the beam of ions against the position of a substrate to be etched mounted on the stage;

(g) connecting second control means to the ion gun to control the beam of ions;

(h) placing a substrate to be etched into the evacuated chamber on the stage receiving at a desired angle for etching; and,

(i) using the first and second control means to control the amount of excited chlorine radicals and Ar^+ ions impinging on the substrate.

4,874,460

METHOD AND APPARATUS FOR MODIFYING PATTERNED FILM

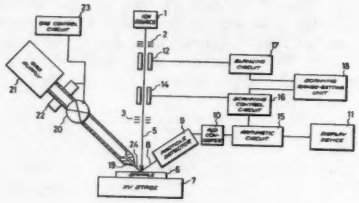
Yoshitomo Nakagawa, and Takehiro Yamaoka, both of Tokyo, Japan, assignors to Seiko Instruments Inc., Tokyo, Japan

Filed Nov. 16, 1988, Ser. No. 272,017

Claims priority, application Japan, Nov. 16, 1987, 62-288656; May 6, 1988, 63-110191

Int. Cl.[4] B44C *1/22;* C03C *15/00, 25/06;* C23F *1/02*

U.S. Cl. 156—626 7 Claims



5. A method for modifying a patterned film on a sample surface, comprising:

producing a focussed ion beam and causing the beam to impinge upon the sample surface to microscopically machine a small region of the surface which contains the patterned film, impingement of the beam causing secondary charged particles to be emitted from the sample surface;

causing the focussed beam to scan the sample surface by impinging on each one of a plurality of spots in the region in a given sequence and impinging on each spot for a given period of time;

detecting the secondary charged particles emitted from the sample surface in response to impingement of the beam; and

spraying etching gas capable of etching the film onto the surface region while the beam is being caused to scan the region.

4,874,461

METHOD FOR MANUFACTURING LIQUID CRYSTAL DEVICE WITH SPACERS FORMED BY PHOTOLITHOGRAPHY

Masahiko Sato; Toshimitsu Konuma, both of Atsugi; Seiichi Odaka, Kisakata; Toshiharu Yamaguchi, Zama; Toshio Watanabe, Atsugi; Osamu Aoyngi, Atsugi; Kaoru Tabata, Atsugi; Chizuru Isigaki, Atsugi; Hiroyuki Sakayori, Machida; Ippei Kobayashi, Atsugi; Akio Osabe, Atsugi, and Shunpei Yamazaki, Tokyo, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

Division of Ser. No. 87,275, Aug. 20, 1987. This application Jul. 21, 1988, Ser. No. 222,633

Claims priority, application Japan, Aug. 20, 1986, 61-196424

Int. Cl.[4] B44C *1/22;* B29C *37/00;* C03C *15/00, 25/06*

U.S. Cl. 156—633 8 Claims

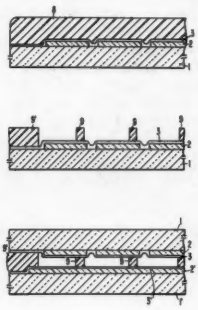
1. A method for manufacturing a liquid crystal device comprising the step of:

forming electrode arrangement on the inside surfaces of a pair of substrates;

coating the inside surface of one of said substrate with photocurable resin;

exposing the photocurable resin coating to illumination except for the portions to be pillars and sealing member through a mask;

removing the uncured portion of said photocurable resin with a solvent; and



joining and uniting said pair of substrates;

disposing a liquid crystal between said pair of substrates.

4,874,462

METHOD OF FORMING PATTERNED FILM ON SUBSTRATE SURFACE BY USING METAL ALKOXIDE SOL

Kensuke Makita, Mie; Akimasa Hattori, Matsusaka, and Katsuto Tanaka, Matsusaka, all of Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Dec. 8, 1988, Ser. No. 281,269

Claims priority, application Japan, Dec. 9, 1987, 62-309389

Int. Cl.[4] B44C *1/22;* C03C *15/00, 25/06;* C23F *1/02*

U.S. Cl. 156—635 21 Claims

1. in a method of forming a patterned film of an inorganic metal compound on a substrate, the method having the steps of applying a metal alkoxide sol to a substrate to form a sol film on the substrate, allowing the sol film to turn into a gel film by hydrolysis of the metal alkoxide, removing the gel film in the unnecessary area or areas by selective etching, and then baking the film in the remaining area or areas to completely convert the material of the film into the desired inorganic metal compound.

the improvement comprising making said selective etching by the steps of applying a viscous liquid, which is capable of at least partially decomposing the gel film, to the gel film in the unnecessary area or areas and allowing the applied viscous liquid to permeate into and moisten the underlying gel film, heating the gel film which is moistened with said viscous liquid in the unnecessary area or areas at a temperature lower than 300° C. to thereby harden the gel film in the necessary area or areas, and removing the gel film in the unnecessary area or areas together with the residue of the applied viscous liquid by washing with at least one washing liquid.

4,874,463

INTEGRATED CIRCUITS FROM WAFERS HAVING IMPROVED FLATNESS

Jeffrey T. Koze, Whitehall, and Anton J. Miller, Lehigh County, both of Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.Y.

Filed Dec. 23, 1988, Ser. No. 290,653

Int. Cl.[4] H01L *21/306;* B44C *1/22;* C03C *15/00, 25/06*

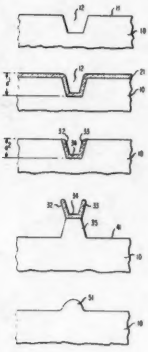
U.S. Cl. 156—645 17 Claims

1. A method of making integrated circuits formed on a given side of a wafer,

characterized in that said wafer is prepared by steps comprising:

(1) forming an etch resistant coating on said given side of said wafer having a surface with depressions;

(2) removing said etch resistant coating from the surface of said given side while retaining the coating on the sidewalls of depressions in the surface;



(3) isotropically etching said given side so as to remove a depth of material from said given side and to undercut at least a portion of said etch resistant coating on the sidewalls; and

(4) removing the remaining portions of said etch resistant coating from the given side of said wafer,

whereby a wafer having improved flatness is obtained.

4,874,464

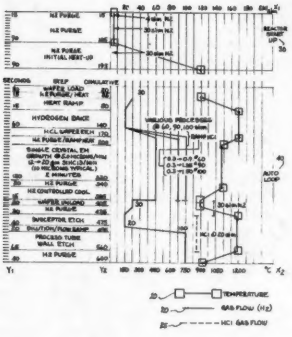
PROCESS FOR EPITAXIAL DEPOSITION OF SILICON

Dennis L. Goodwin, Tempe; Mark R. Hawkins, Mesa; Wayne L. Johnson, Phoenix; Aage Olsen, Chandler, and McDonald Robinson, Paradise Valley, all of Ariz., assignors to Epsilon Limited Partnership, Tempe, Ariz.

Filed Mar. 14, 1988, Ser. No. 167,347

Int. Cl.[4] H01L *21/306, 21/205;* C03B *23/00;* B44C *1/22*

U.S. Cl. 156—646 **21 Claims**



1. A process for epitaxial deposition of a semiconductor material onto a substrate, comprising the steps of:

loading the substrate onto a susceptor in a deposition reactor reaction chamber at an elevated temperature;

purging the deposition reactor of ambient gases while simultaneously heating the deposition reactor to a temperature greater than deposition temperature;

etching the substrate with an etchant gas to remove impurities from its exposed surface;

purging the deposition reactor of said etchant gas while simultaneously reducing the temperature of the deposition reactor to deposition temperature;

flowing a gaseous stream of a reactant semiconductor species into the deposition reactor, thereby depositing said reactant semiconductor species onto said exposed surface of said semiconductor wafer;

purging the deposition reactor of ambient gases while cooling the deposition reactor to said elevated temperature; and

unloading the semiconductor wafer having said reactant semiconductor species deposited thereupon.

4,874,465

TISSUE PRODUCTS CONTAINING SLICED FIBERS

Faith E. Cochrane; Michael J. Smith, both of Neenah, and John D. Litvay, Appleton, all of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Mar. 28, 1988, Ser. No. 173,961

Int. Cl.[4] D21H *5/24*

U.S. Cl. 162—111 **5 Claims**

1. A tissue product comprising a fibrous sheet having a dry basis weight of from about 5 to about 40 pounds per 2880 square feet and having a bulk density of less than about 0.20 grams per cubic centimeter, said sheet comprising from about 5 to 100 weight percent lengthwise-sliced individual fibers based on the total fiber content of the product, said lengthwise-sliced fibers exhibiting a substantially reduced Coarseness Index.

4,874,466

PAPER MAKING FILLER COMPOSITION AND METHOD

Carolyn A. Savino, Naperville, Ill., assignor to Nalco Chemical Company, Naperville, Ill.

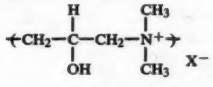
Continuation of Ser. No. 920,092, Oct. 17, 1986, abandoned. This application Sep. 28, 1988, Ser. No. 250,224

Int. Cl.[4] D21H *3/78, 3/48*

U.S. Cl. 162—164.3 **4 Claims**

1. A method of treating a paper making pulp to increase the uniformity of titanium dioxide distribution within the web of the paper produced from said pulp comprising:

admixing with water a cationic water soluble polymer comprised of at least fifty percent by weight of repeating units consisting of a quaternary ammonium salt moiety having the structural formula of



wherein X is a halide or a sulfate, said cationic water soluble polymer having a molecular weight of from 5,000 to 50,000, and agitating said mixture;

adding to said mixture of water and cationic water soluble polymer, with agitation, an amount of titanium dioxide to form a dispersion in which said cationic water soluble polymer is present in the amount of from 0.1 to 2.0 weight percent based on said titanium dioxide;

said dispersion characterized in that the charge of said dispersion is cationic and in that auto-flocculation is inhibited upon dilution of said dispersion to about 5 weight percent titanium dioxide in water; and

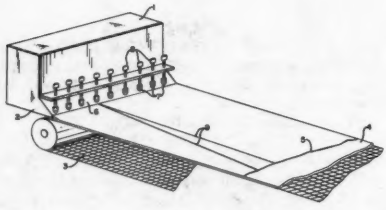
admixing said dispersion with paper making pulp.

4,874,467

METHOD OF CONTROLLING CROSS PROFILE OF PROPERTIES OF PAPER WEB

Hakan I. Karlsson, Åkersberga; Inge J. Lundqvist, Spånga; Bengt Y. Härdin, Hägersten, and Thomas L. Östman, Sp522 nga,all of Sweden, assignors to Svenska Traforskningsinstitutet, Sweden

Continuation of Ser. No. 438,573, Nov. 1, 1982, abandoned, which is a continuation of Ser. No. 264,838, May 18, 1981, abandoned. This application Aug. 14, 1987, Ser. No. 86,195
Claims priority, application Sweden, Jun. 2, 1980, 8004084
Int. Cl.[4] D21F *1/02, 7/00, 9/02*
U.S. Cl. 162—198 9 Claims



1. A method of controlling a cross profile of properties of a paper web across a feed direction thereof in a paper machine, wherein said cross profile can be affected by several setting positions across the web in such a manner that a definite change in a setting position brings about a corresponding response in said cross profile, said response extending in a lateral direction beyond that web portion which corresponds to the web width of the setting, said method comprising the steps of:

measuring an actual cross profile and comparing with a desired cross profile;

indicating a deviation between the measured cross profile and the desired cross profile in the form of a first error cross profile;

comparing each of the responses from the setting positions by turn with the first error cross profile for determining necessary mutual relative change in each setting position by multiplying the first error profile with the response locally about each setting position and summing up the result;

calculating the corresponding necessary relative change in the cross profile from said determined necessary relative change in each setting position by means of the responses;

determining an amplifying factor (k) by minimizing the difference between the desired cross profile and the measured cross profile added to the result of k multiplied with the necessary relative cross profile change;

calculating necessary absolute change in each setting position as k corresponding relative change;

determining the resulting change in cross profile by means of the responses;

adding said determined change in cross profile to the measured cross profile and comparing with the desired cross profile to determine a deviation which constitutes a second error cross profile;

repeating the method with said second error cross profile if the deviation is greater than a predetermined degree; and

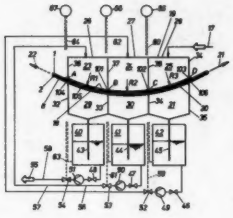
utilizing the calculated necessary absolute change in each setting position for adjustment in the setting positions.

4,874,468

APPARATUS FOR THE LIQUID TREATMENT OF A FIBROUS BOARD BETWEEN TWO ENDLESS FORAMINOUS BELTS OR WIRES

Johann Sbaschnigg, Graz, and Franz Petschauer, Lannach, both of Austria, assignors to Maschinenfabrik Andritz Actiengesellschaft, Graz, Australia

Continuation of Ser. No. 7,080, Jan. 27, 1987, abandoned. This application Oct. 20, 1988, Ser. No. 262,255
Claims priority, application Austria, Feb. 18, 1986, A 417/86
Int. Cl.[4] D21C *9/02*
U.S. Cl. 162—300 16 Claims



1. An improved apparatus for the treatment of a material passed between upper and lower foraminous belts, the material being made to pass between the foraminous belts along at least two treatment containers for a treatment liquid a source of treatment liquid being connected to said treatment containers, at least one of the treatment containers being provided with a wall having orifices on a side of the treatment containers facing the material for applying the treatment liquid to the foraminous belts and the material therebetween, comprising:

a first of the treatment containers being arranged above the upper foraminous belt in contact with the same, said treatment container being formed as a pressure container;

means for maintaining pressure of the interior of said first treatment container;

said first treatment container being provided with a bottom having orifices facing the upper belt for generating a pressure difference in the upper belt and being otherwise closed against the environment so that the first treatment container dispenses the treatment liquid under superpressure to the upper and lower belts and to the material therebetween;

at least one pressureless collecting container, open to the environment, arranged opposite the first treatment container below the upper foraminous belt;

said at least two treatment containers having side walls and walls facing the foraminous belts, said side walls being arranged immediately side by side, said facing walls being in tight contact with the foraminous belts, said facing walls being, as far as they are located on the same side of the material, continuously merging with one another and thus generating guiding surfaces for the foraminous belts and the material;

an adjustable perforated pressure plate located adjacent the lower belt opposite the first treatment container; and

means for adjusting the pressure plate for the purpose of tightly pressing the foraminous belts and the material therebetween against the first treatment container, the face of the pressure plate facing the material being formed plane.

7. An improved apparatus for the treatment of a material passed between upper and lower foraminous belts, the material being made to pass between the foraminous belts along at least two treatment containers for a treatment liquid, a source of treatment liquid being connected to said treatment containers, at least one of the treatment containers closed to the environment having means for sealing walls against the foraminous

belts and thus against the material, but otherwise open towards the foraminous belts, comprising:

a first of the treatment containers being arranged adjacent the upper foraminous belt in contact with the same, said treatment container being formed as a pressure container;

means for maintaining pressure of the interior of said first treatment container;

said first treatment container being closed against the environment having means for sealing the walls against the upper belt, but otherwise open towards the upper belt, so the first treatment container dispenses the treatment liquid under superpressure to the upper and lower belts and to the material therebetween;

said at least two treatment containers having side walls and walls facing the foraminous belts, said side walls being arranged immediately side by side, said facing walls being in tight contact with the foraminous belts and said facing walls being formed convexly, said facing walls being, as far as they are located on the same side of the material, continuously merging with one another and thus generating smoothly curving guiding surfaces for the foraminous belts and the material each treatment container has an open pressureless collecting container, open to the environment, arranged below a respective upper treatment container and adjacent the lower foraminous belt, of essentially identical dimensions of horizontal cross sections where they face the foraminous belts;

each open pressureless collecting container has side walls; and

each side wall of each treatment container is perpendicularly aligned above a side wall of an open pressureless collecting container; and means for adjusting the position of said pressure containers.

4,874,469

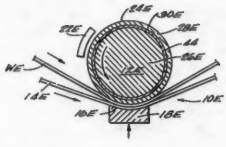
HEATED EXTENDED NIP PRESS WITH POROUS ROLL LAYERS

Jeffrey H. Pulkowski; Elizabeth A. Macklem, both of Beloit, Wis., and L. H. Busker, Rockton, Ill., assignors to Beloit Corporation, Beloit, Wis.

Continuation-in-part of Ser. No. 895,885, Aug. 12, 1986, Pat. No. 4,738,752. This application Aug. 27, 1987, Ser. No. 89,887

Int. Cl.[4] D21F *3/00, 5/00*

U.S. Cl. 162—359 **7 Claims**



1. An apparatus for removing fluid from a fibrous web, said apparatus comprising:

a press member;

blanket means cooperating with said press member for defining therebetween an elongate pressing section such that the web is pressed between said press member and said blanket means during passage through said pressing section;

a pressing shoe for urging said blanket means toward said press member such that when the web passes through said pressing section, fluid is removed from the web;

heating means disposed adjacent to said press member for transferring heat to the web and structured such that when the web passes through said press section, the web is subjected for an extended period to increased pressure and temperature so that water vapor generated within said pressing section during passage through said pressing section forces the fluid in the liquid phase away from the web;

said press member defining a pressing surface which is porous for inhibiting delamination of the web;

said press member further including:

a first solid inner layer;

a second outer layer extending around said first layer, said second layer having a pore size of between 5–50 microns; and

a third intermediate layer disposed between said first and second layers, said third layer having a pore size within the range of 50–100 microns such that said third layer assists in ventilating said second layer and the web.

4,874,470

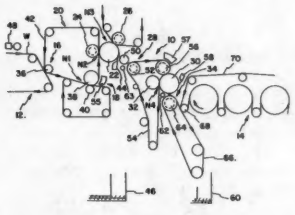
PAPERMAKING PRESS SECTION AND TRANSFER ARRANGEMENT TO DRYER SECTION

Borgeir Skaugen, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Filed Oct. 4, 1988, Ser. No. 253,283

Int. Cl.[4] B21F *3/04*

U.S. Cl. 162—360.1 **15 Claims**



1. A press apparatus for pressing water from a web which extends from a forming section to said press apparatus and subsequently from said press apparatus to a drying section, said apparatus comprising:

pick-up means disposed closely adjacent to the forming section for picking-up the formed web from the forming section;

a roll couple disposed downstream relative to said pick-up means, said roll couple defining therebetween a first nip for pressing a first portion of water form the formed web;

transfer means cooperating with said pick-up means and said roll couple for transferring the web from said pick-up means to said first nip;

a press roll disposed downstream relative to said roll couple;

a first backing roll disposed downstream relative to said roll couple, said first backing roll cooperating with said press roll for defining therebetween a second nip for pressing a second portion of water form the web, said transfer means cooperating with said first backing roll for transferring the web from said first to said second nip;

a second backing roll disposed downstream relative to said second nip, said second backing roll cooperating with said press roll for defining therebetween a third nip for pressing a third portion of water form the web;

a doctor cooperating with said press roll for doctoring the web from said press roll after passage of the web through said third nip;

a broke pit disposed beneath said doctor for receiving broke doctored from said press roll;

guide means disposed downstream relative to said third nip for guiding the web away from said press roll subsequent to the passage of the web through said third nip;

a further press roll disposed downstream relative to said third nip, said guide means guiding the web from said third nip to said further press roll;

a further backing roll cooperating with said further press roll for defining therebetween a fourth nip;

a further doctor cooperating with said further press roll for doctoring the web from said further press roll after passage of the web through said fourth nip;

a further broke pit disposed beneath said further doctor for receiving broke doctored from said further press roll; and

lead-in means disposed closely adjacent to and below said further press roll and downstream relative to said fourth nip and upstream relative to said further doctor blade for leading the web from said further press roll to the drying section

said lead-in means further includes a lead-in roll disposed closely adjacent to said further press roll for drawing the web away from said further press roll,

a lead-in felt extending around said lead-in roll such that the web is supported by said lead-in felt and said lead-in roll towards the dryer section; and the dryer section further includes

a vacuum transfer roll disposed above and in abutting relationship with said lead-in felt such that the web is disposed between said lead-in felt and said transfer roll;

a dryer felt extending around said vacuum transfer roll such that the web is drawn by said vacuum transfer roll away from said lead-in felt and so that the web is guided by said dryer felt through the dryer section.

4,874,471
DEVICE FOR CASTING A METAL IN THE PASTY PHASE

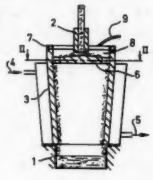
Stéphan Wilmotte, Ninane, Chaud-Fontaine, Belgium, assignor to Centre de Recherches Metallurgiques-Centrum Voor Research in de Metallurgie, Brussels, Belgium

Filed Nov. 27, 1987, Ser. No. 126,261

Claims priority, application Luxembourg, Nov. 26, 1986, 86688; Jan. 16, 1987, 86739

Int. Cl.[4] B22D *11/124*

U.S. Cl. 164—437 **19 Claims**



1. A device for continuously casting a metal in the pasty phase in a continuous casting mold comprising:

a casting nozzle having an outlet;

a vertical conduit disposed upstream of the mold with respect to the direction of travel of the metal from the casting nozzle, said conduit having an inlet, an outlet, and an inner surface extending between said conduit inlet and outlet;

said conduit comprising,

an inlet section adjacent said inlet,

an inner surface formed of refractory material on said inlet section, and

a downstream section disposed downstream of said inlet section;

cooling means for cooling said downstream section of said conduit externally of said inner surface thereof;

a distributor member disposed in said inlet section of said conduit having a surface in closely spaced relationship to said nozzle outlet for receiving metal poured thereon from said nozzle outlet, said distributor surface extending transversely with respect to said conduit inlet section a sufficient distance for discharging the metal directly against said inner surface of said inlet section; and means for injecting a gaseous agent into said conduit at a position downstream of and adjacent to said distributor member for producing a gas pocket within said conduit for urging the metal against said inner surface of said conduit.

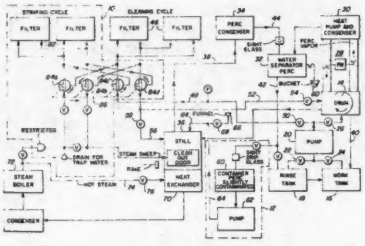
4,874,472
DRY CLEANING EQUIPMENT UTILIZING PERCHLORETHYLENE RECOVERY PROCESS

Tilo Kohler, West Babylon, N.Y., assignor to Richard L. Miller, Dix Hills, N.Y.

Division of Ser. No. 857, Jan. 6, 1987, Pat. No. 4,780,218. This application Oct. 20, 1988, Ser. No. 260,114

Int. Cl.[4] B01D *3/02*

U.S. Cl. 202—169 **1 Claim**



1. In a dry cleaning apparatus using perchlorethylene as a cleaning solvent, said apparatus including a drum for tumbling the fabric to be cleaned together with said solvent, a still for receiving contaminated solvent after use in said drum, a source of steam, means for feeding said steam into said still for sweeping the still and dissolving the contaminates from said solvent, a condenser for receiving said mixture of solvent and steam an condensing said mixture, a water separator receiving the condensed mixture from said condenser and removing condensed water from said mixture leaving solvent from which contaminants have been removed, and a storage tank for holding said condensed solvent with a conduit passing the decontaminated solvent from said water separator to said storage tank whereby the solvent in the storage tank can be used again in the drum, the improvement which comprises:

means for enabling transfer of substantially all of said contaminated solvent from said drum to said still, including,

(a) means connected with said conduit for diverting said solvent into a holding container at selected intervals during operation of said dry cleaning apparatus, and

(b) pump means for passing said solvent from said holding container into said still for further decontamination thereof, whereby a substantially higher amount of contaminated solvent is recovered and substantially less contaminated solvent is discarded.

4,874,473
SEPARATION OF DIASTEREOMERS BY EXTRACTIVE DISTILLATION

Dieter Arlt, Cologne; Ulrich Schwartz, Leverkusen; Hans-Walter Brandt; Wolfgang Arlt, both of Odenthal, and Andreas Nickel, Wetter, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 16, 1987, Ser. No. 39,550

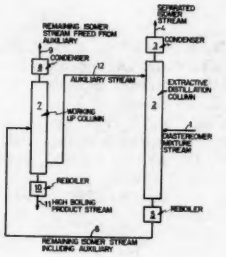
Claims priority, application Fed. Rep. of Germany, Apr. 25, 1986, 3613975

Int. Cl.[4] B01D *3/40*; C07B *57/00*

U.S. Cl. 203—1 **6 Claims**

1. A process for the separation of diastereomers from each other wherein said diastereomers are selected from the group consisting of cis/trans permethric acid esters, cis/trans acid chlorides of permethric acid, menthol/isomenthol and the methyl esters of cis/trans caronaldehyde acid comprising adding to a mixture of diastereomers an auxiliary which allows or improves the resolution of said diasteromer mixture by distilla-

tion and separating the diasteromers by extractive distillation said auxiliary being selected from the group consisting of glycerol, diethanolamine, diphenyl ether, acetamide, N-methylacetamide, N-methylformamide, acetone, furfurol, acetonitrile, dimethylformamide, dimethylacetamide, N-methylpyrrolidone, N-formylmorpholine, benzyl alcohol, phenol, dimethylsulphoxide, sulpholane, glutaric acid dinitrile, succinic acid dinitrile, succinic acid amide, N-methylcaprolactam, 4-methylmorpholine, 2-pyrrolidone and 1-methyl-oxo-phospholine.

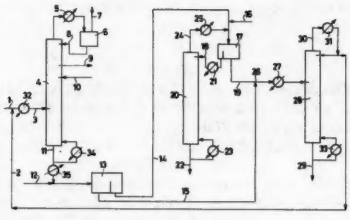


4,874,474

PROCESS FOR DEHYDRATING A MIXTURE OF METHANOL AND HIGHER ALCOHOLS

Carlo Rescalli, San Donato Milanese; Riziero Ricci, Cortemaggiore; Adriano Scazzosi, Corbetta, and Flavio Cianci, San Donato Milanese, all of Italy, assignors to Snamprogetti S.p.A., Milan, Italy

Filed Apr. 1, 1988, Ser. No. 176,457
Claims priority, application Italy, Apr. 2, 1987, 19938 A/87
Int. Cl.[4] E01D *3/14*
U.S. Cl. 203—18 18 Claims



1. A process comprising dehydrating a mixture of methanol and higher alcohols containing 20 to 80% by weight of methanol, 1 to 60% by weight of at least a higher alcohol selected from the group consisting of those having 2 to 10 carbon atoms, 1 to 50% by weight of water, and 0.1 to 10% by weight of hydrocarbons, oxygen-containing organic compounds different from alcohols, and combinations thereof, by the following steps:

(a) feeding to a first rectification tower said mixture of methanol and higher alcohols to be dehydrated, a gaseous stream being discharged from the tower head which contains a portion of the hydrocarbons, oxygen-containing organic compounds different from the alcohols or combinations thereof; from a side point at a level higher than ⅓ of the tower height, a stream containing methanol, ethanol or combinations thereof being drawn; and from the tower bottom a stream with a methanol, ethanol or combinations thereof having a content not larger than 10% by weight being obtained;

(b) separating at least once the stream obtained from the bottom of the first column into two phases, one of which is aqueous, and the other phase being organic;

(c) feeding the organic phase to a second tower of azeotropic distillation, using a liquid-vapor and liquid-liquid separation agent; at the bottom an anhydrous stream being obtained, which contains the higher alcohols; and from the tower head a stream being obtained, which contains methanol, ethanol, propanol or combinations thereof, water, and the separation agent used, which is added to the stream obtained from the bottom of the first tower; and

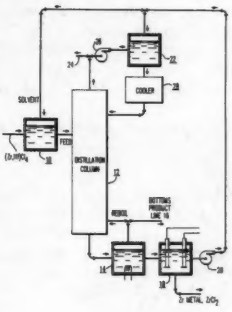
(d) feeding the aqueous phase to a third rectification tower; from the bottom a stream being removed, which contains water, and an overhead stream being recovered, which is enriched with methanol and upper alcohols, which is recycled by being added to the mixture of methanol and higher alcohols to be dehydrated before the latter is fed to the first rectification tower.

4,874,475

MOLTEN SALT EXTRACTIVE DISTILLATION PROCESS FOR ZIRCONIUM-HAFNIUM SEPARATION

David F. McLaughlin, Oakmont, and Richard A. Stoltz, Murrysville Boro, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 12, 1988, Ser. No. 242,570
Int. Cl.[4] B01D *3/40;* C01G *25/04, 27/04;* C22B *34/14*
U.S. Cl. 203—51 3 Claims



1. In a process for zirconium-hafnium separation which utilizes an extractive distillation column with a mixture of zirconium and hafnium tetrachlorides introduced into a distillation column having a top and a bottom with hafnium enriched overheads taken from the top of the column and a molten salt solvent circulated through the column to provide a liquid phase, and with molten salt solvent containing zirconium chloride being taken from the bottom of the distillation column, the improvements comprising:

a. utilizing a molten salt solvent consisting principally of lithium chloride and at least one of sodium, potassium, magnesium and calcium chlorides;

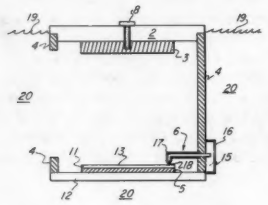
b. stripping of the zirconium chloride taken from the bottom of the distillation column by electrochemically reducing zirconium from the molten salt solvent; and

c. utilizing a pressurized reflux condenser on the top of the column to add said hafnium chloride enriched overheads to the molten salt solvent previously stripped of zirconium chloride which molten salt solvent is being circulated back to the top of the column.

4,874,476
FIXTURE FOR PLATING TALL CONTACT BUMPS ON INTEGRATED CIRCUIT

Roger J. Stierman, Richardson; Archie N. McCauley, Little Elm, and Robert C. Zart, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 37,760, Apr. 13, 1987. This application Oct. 5, 1988, Ser. No. 253,804
Int. Cl.[4] C25D 5/02
U.S. Cl. 204—15 3 Claims



1. A method of plating bumps on metallization on the face of a wafer, comprising the steps of:
placing the wafer face up on sealing means in a bump-plating fixture so that the back of the wafer abuts the sealing means and the wafer is disposed below an anode means in the fixture:
placing force means against the metallization on the face of the wafer to effect electrical connection of the force means with the metallization:
whereby said force means causes the back of the wafer to press against the sealing means to form a high integrity seal to prevent the plating bath from coming into contact with the back of the wafer:
inserting the fixture with the wafer into a clean up or presoak bath:
removing the fixture and wafer from the clean up or presoak bath; and
inserting the fixture with the wafer into the plating bath.

4,874,477
PROCESS FOR PREPARING THE THROUGH HOLE WALLS OF A PRINTED WIRING BOARD FOR ELECTROPLATING

Phillip Pendleton, Kinnelon, N.J., assignor to Olin Hunt Specialty Products Inc., Palisades Park, N.J.

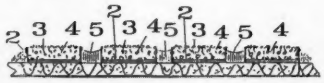
Filed Apr. 21, 1989, Ser. No. 341,614
Int. Cl.[4] C25D 5/02, 5/54
U.S. Cl. 204—15 18 Claims

1. A process for electroplating the walls of through holes in a laminated printed wiring board comprised of at least one non-conducting layer laminated to at least two separate conductive metal layers, which comprises the steps:
(a) contacting said printed wiring board with an aqueous polyelectrolyte homopolymer conditioner solution having a charge density from about 0.2 to about 2.5 milliequivalents (positive charge) per gram of dissolved polymer and having a pH in range from about 3 to about 5, followed by;
(b) contacting said printed wiring board with a dispersion of carbon black comprising:
(1) carbon black particles having an average particle size of less than about 3.0 microns in said dispersion;
(2) an effective dispersing amount of a surfactant which is compatible with said carbon black; and
(3) a liquid dispersing medium, wherein the amount of carbon black is sufficient to coat substantially all of said non-conducting surfaces and is less than about 4% by weight of said liquid dispersion; then
(c) separating substantially all of the liquid dispersing medium from said dispersion, thereby depositing said applied carbon black particles in a substantially continuous layer on said non-conducting portions of said hole walls; and
(d) electroplating a substantially continuous metal layer over the deposited carbon black layer on said non-conducting portions of hole walls, thereby electrically connecting said metal layers of said printed wiring board.

4,874,478
METHOD OF FORMING A FLEXIBLE ABRASIVE

Maher Ishak, Pte. Claire, and Alexander Schwartz, Westmount, both of Canada, assignors to Diabrasive International Ltd., Ville St. Laurent, Canada

Filed Feb. 29, 1988, Ser. No. 161,940
Claims priority, application Canada, Feb. 27, 1987, 530811; Mar. 13, 1987, 531996; Oct. 21, 1987, 549901; Nov. 20, 1987, 552387; Jan. 7, 1988, 556049
Int. Cl.[4] C25D 15/00
U.S. Cl. 204—16 34 Claims



1. A method of forming an abrasive member, comprising:
laminating a metal foil to one surface of a non-conductive flexible sheet to form a composite substrate,
applying a mask of plating resistant material to the exposed surface of the metal foil, said plating resistant material having a multitude of discrete openings therein,
electrodepositing metal through said discrete openings onto said metal foil in the presence of particulate abrasive material so that the electrodeposited metal adheres directly to said metal foil and the abrasive material becomes embedded in the electrodeposits,
stripping away the mask from the sheet to expose the metal foil, and
etching way the metal foil between the discrete metal electrodeposits to expose the flexible sheet.

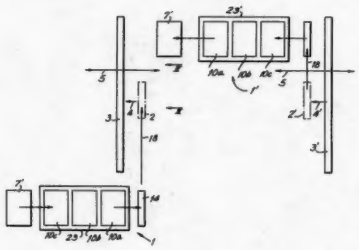
4,874,479
METHOD AND DEVICE FOR FEEDING PLATE SHAPED OBJECTS INTO AND FROM SUSPENSION FRAMES OF AN INSTALLATION FOR CHEMICAL TREATMENT IN BATHS, PARTICULARLY IN ELECTROPLATING BATHS INSTALLATION

Peter Haase, Feucht; Thomas Kosikowski, Nuremberg, and Horst Steger, Altdorf, all of Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Division of Ser. No. 153,133, Feb. 8, 1988. This application Jan. 17, 1989, Ser. No. 298,517
Claims priority, application Fed. Rep. of Germany, Feb. 6, 1987, 3703542
Int. Cl.[4] C25O 5/00
U.S. Cl. 204—27 5 Claims

1. A method of loading or unloading plate-like objects to or from suspension frames mounted on a supporting structure in an installation for chemical treatment of the objects in baths, particularly in electroplating baths, wherein the objects in the suspension frames are held in vertical position, comprising the steps of placing the plate shaped objects one after the other in a station arranged near a side of the supporting structure; orienting each object into a vertical position at the station; transporting the objects in their vertical position from the station to a feeding point opposite an assigned suspension frame; transferring the objects at the feeding point into the

assigned frame; after the chemical treatment, separating the object from the suspension frame at a transfer point; and transporting the objects from the transfer point to a discharging station.



4,874,480

PROCESS FOR TREATMENT OF TITANIUM AND TITANIUM ALLOYS

Sakae Sonoda; Kouji Hetsugi; Yoshihiko Sawasaki; Kouji Kaburagi, and Yasunobu Matsushima, all of Kanagawa, Japan, assignors to Henkel Corporation, Ambler, Pa.

Filed Apr. 20, 1988, Ser. No. 184,548

Claims priority, application Japan, Apr. 20, 1987, 62-97216

Int. Cl.[4] C25D *11/36*

U.S. Cl. 204—56.1 **19 Claims**

1. A process for improving the lubricity and cold working characteristics of an object made of titanium or a titanium alloy, said process comprising:

(a) immersing said object made of titanium or titanium alloy as a cathode in an electrolytic conversion coating solution containing an effective concentration of acidic zinc phosphate present as zinc and phosphoric acid ions;

(b) maintaining electrolysis conditions to form an adherent zinc phosphate film on said object; and

(c) treating said adherent zinc phosphate film with a lubricant.

15. A process for improving the lubricity and cold working characteristics of an object made of titanium or a titanium alloy, said process comprising:

(a) treating said object made of titanium or titanium alloy with a colloidal titanium-based surface adjustment agent;

(b) immersing said object made of titanium or titanium alloy as a cathode in an electrolytic conversion coating solution containing an effective concentration of acidiz zinc phosphate present as zinc and phosphoric acid ions;

(c) maintaining electrolysis conditions to form an adherent zinc phosphate film on said object; and

(d) treating said adherent zinc phosphate film with a lubricant.

4,874,481

N,N'-DIPHENYLBENZIDINE POLYMER AND METHOD OF PRODUCING THE SAME

Tetsuro Suzuki, Fuji; Masao Yoshikawa, Numazu, and Akio Kojima, Hiratsuka, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

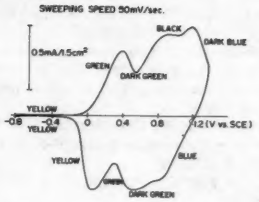
Continuation of Ser. No. 900,414, Aug. 26, 1986, abandoned. This application May 2, 1988, Ser. No. 188,756

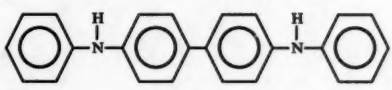
Claims priority, application Japan, Sep. 2, 1985, 60-191991

Int. Cl.[4] C25B *3/00, 3/10*

U.S. Cl. 204—59 R **15 Claims**

1. An N,N'-diphenylbenzidine polymer prepared by electrochemically polymerizing N, N'-diphenylbenzidine having the formula (I) as monomer:





(I)

4,874,482

PROCESS FOR THE ELECTROYTIC PRODUCTION OF NON-METALS

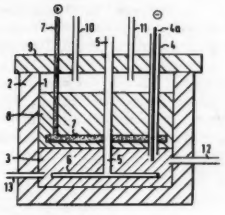
Anthonie Honders; Alfred J. Horstik, and Gerbrand J. M. Van Eyden, all of Arnhem, Netherlands, assignors to Shell Internationale Research Maatschappij B.V., The Hague, Netherlands

Filed Mar. 15, 1988, Ser. No. 167,752

Claims priority, application United Kingdom, Apr. 1, 1987, 8707780

Int. Cl.[4] C25B *1/00*

U.S. Cl. 204—60 **22 Claims**



1. A process for the production of non-metallic element Nm or a mixture/compound containing Nm from a non-metal halide NmX_n or a complex halide A_mNmX_o by electrolysis in a cell comprisng an anode, a liquid metal cathode comprising one or more metals M and a liquid electrolyte comprising a salt melt of one or more alkali metal halides or alkaline earth metal halides, which comprises the steps of: introducing non-metallic halide NmX_n or complex halide AmNmXo directly into the liquid metal cathode and withdrawing Nm or a mixture/compound containing Nm from the metal cathode material, wherein Nm represents a non-metallic element selected from the group consisting of 3*a*, 4*a*, 5*a*, and 6*a* of the periodic table, X represents halogen, n represents the valency of Nm, A represents an alkali metal and o represents the valency of Nm plus m.

4,874,483

PROCESS FOR THE PREPARATION OF REDOX BATTERY ELECTROLYTE AND RECOVERY OF LEAD CHLORIDE

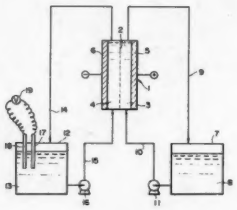
Ataru Wakabayashi; Yohichi Umehara, both of Yokohama; Satsuki Morie; Ikuro Kuwahara, both of Kawasaki, and Yoshimi Okada, Yokohama, all of Japan, assignors to Chiyoda Corporation, Japan

Filed Jan. 31, 1989, Ser. No. 304,265

Claims priority, application Japan, Feb. 4, 1988, 63-22844; Nov. 24, 1988, 63-297966

Int. Cl.[4] H01M *8/18;* C25B *1/26;* C25C *1/24*

U.S. Cl. 204—94 10 Claims



1. A process for the preparation of a redox battery electrolyte, comprising the steps of:

(a) dissolving a raw material containing sources of chromium ions and/or iron ions and nickel ions in a hydrochloric acid-containing aqueous liquid to form a solution containing chromium ions and/or iron ions and nickel ions; and

(b) subjecting the solution to an electrolytic reduction in a cathode compartment in the presence of lead ions until the electric potential of the solution becomes lower than −0.6 V vs. saturated calomel electrode, thereby to cause the nickel ions to deposit on the cathode together with the lead ions.

2. A process according to claim 1, further comprising the steps of:

(c) after step (b), discharging the solution from the cathode compartment for recovery;

(d) then introducing a cleaning liquid into the cathode compartment to dissolve the deposits on the cathode to obtain a liquor containing lead and nickel ions;

(e) discharging said liquor from the cathode compartment; and

(f) recovering the lead ions as lead chloride.

4. A process according to claim 2, wherein said cleaning liquid is hydrochloric acid and wherein step (d) includes subjecting the cathode on which nickel and lead have deposited to anodic oxidation in the hydrochloric acid.

4,874,484

ETCHING METHOD FOR GENERATING APERTURED OPENINGS OR TRENCHES IN LAYERS OR SUBSTRATES COMPOSED OF N-DOPED SILICON

Helmut Foell, and Volker Lehmann, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

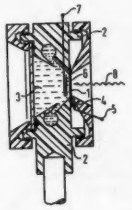
Filed May 13, 1988, Ser. No. 193,760

Claims priority, application Fed. Rep. of Germany, May 27, 1987, 3717851

Int. Cl.[4] C25F *3/12*

U.S. Cl. 204—129.3 9 Claims

1. A method for generating apertured openings of trenches in substrates composed of n-silicon, as used in the manufacture of semiconductor components, especially LSI semiconductor circuits, through masked etching, wherein an electrolytic etching is carried out in an electrolyte containing hydrofluoric acid, through the application of a constant or chronologically varying potential, the silicon substrate being connected as a positively polarized electrode of an electrolysis cell, the electrolysis being injected by illuminating the silicon member



proceeding from a backside and a structured silicon nitride layer is used as an etching mask.

4,874,485

METHOD FOR THE TREATMENT OF WASTE MATTER

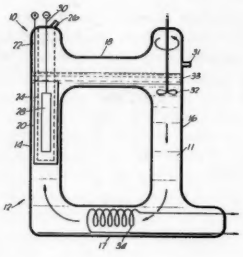
David F. Steele, Caithness, United Kingdom, assignor to United Kingdom Atomic Energy Authority, London, United Kingdom

Filed Jun. 13, 1988, Ser. No. 205,848

Claims priority, application United Kingdom, Jun. 29, 1987, 8715195; Jun. 29, 1987, 8715196

Int. Cl.[4] C02F *1/46*

U.S. Cl. 204—130 14 Claims

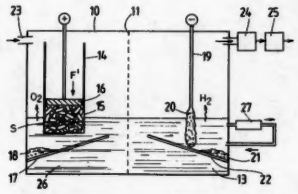


1. A method of treating organic waste matter in which an aqueous electrolyte comprising nitric acid and containing silver ions as an electrochemically regenerable primary oxidising species is subjected to an electric potential, characterised in that the method is performed at a temperature above 50° C. to produce secondary oxidising species from the interaction of the primary oxidising species and the aqueous electrolyte, and the organic matter is added to the electrolyte either continuously or periodically whereby decomposition of the initially and the subsequently added organic matter is predominantly effected by the secondary oxidising species, the primary oxidising species following reduction in the course of the interaction with the aqueous electrolyte being regenerated by the electric potential.

4,874,486
PROCESS FOR THE RECYCLING OF ELECTRICAL BATTERIES, ASSEMBLED PRINTED CIRCUIT BOARDS AND ELECTRONIC COMPONENTS

Jozef Hanulik, Zurich, Switzerland, assignor to RecyTec S.A., Switzerland

Filed Dec. 3, 1987, Ser. No. 128,398
Claims priority, application Switzerland, Dec. 12, 1986, 4960/86
Int. Cl.[4] C25F 5/00
U.S. Cl. 204—140 **13 Claims**



1. A process for the recycling of electrical batteries for equipment of any chemical composition, and of assembled printed circuit boards and electronic components, the starting materials being heated and metals present in the residue being electrolytically deposited, wherein:

(a) a pyrolysis of the unsorted mixture is carried out in a closed furnace at a temperature between 450° C. and 650° C.;

(b) The pyrolysis slag is treated with water or with forofluoric wash acid diluted with water and filtered;

(c) the filter cake is dissolved in borofluoric acid solution;

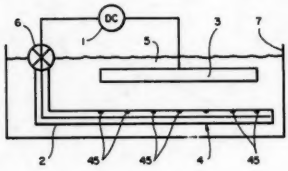
(d) said borofluoric acid solution is used as an electrolyte for carrying out an electrolysis of the dissolved pyrolysis slag in a low-temperature range;

(e) a separation of the anode sludge and the cathode sludge accumulating under both electrodes is carried out, and these sludges are treated for reutilization of the resulting products.

4,874,487
CORROSION PROTECTION

James P. Reed, San Francisco; Michael Masia, and Albert Highe, both of Redwood City, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation of Ser. No. 888,198, Jul. 18, 1986, abandoned. This application Jan. 11, 1988, Ser. No. 142,153
Int. Cl.[4] C23F 13/02
U.S. Cl. 204—147 **19 Claims**



1. An assembly for cathodically protecting an electrically conductive substrate from corrosion, the assembly comprising

(1) an electrically conductive substrate which is liable to corrosion;

(2) an elongate distributed anode which has a shape corresponding generally to the shape of the substrate and which is relatively close to all points on the substrate; and

(3) a barrier which (i) lies between the substrate and the anode, (ii) is spaced apart from the substrate and from the anode, and (iii) is in the form of a tube which surrounds the anode and has a plurality of ion-permeable sections therein such that, when the anode and the substrate are electrically connected to opposite poles of a DC power source and are electrically connected by means of an electrolyte, the barrier restricts the flow of current between the substrate and the anode so that the resistance between the substrate and the anode is Q times the resistance between them in the absence of barrier, where Q is at least 1.5; and

(4) a pump for pumping liquid electrolyte down the tube and through the ion-permeable sections towards the substrate.

4,874,488
PHOTOCHEMICAL DIMERIZATION AND FUNCTIONALIZATION OF ALKANES, ETHERS, PRIMARY AND SECONDARY ALCOHOLS, PHOSPHINE OXIDES AND SILANES

Robert H. Crabtree, Bethany, and Stephen H. Brown, East Haven, both of Conn., assignors to Yale University, New Haven, Conn.

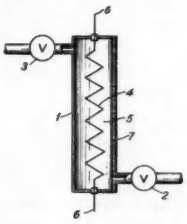
Continuation-in-part of Ser. No. 928,491, Nov. 10, 1986, Pat. No. 4,725,342. This application Nov. 10, 1987, Ser. No. 119,461
The portion of the term of this patent subsequent to Feb. 16, 2005, has been disclaimed.
Int. Cl.[4] B01J 19/08; C07C 2/76, 29/00, 31/00
U.S. Cl. 204—157.15 **24 Claims**

1. A method of improving at least one of the selectivity and space-time yield of a Group IIB photosensitized vapor phase dimerization, which comprises dimerizing a gaseous mixture of (a) a Group IIB metal and (b) a saturated hydrocarbon secondary alcohol, or a mixture of either a saturated hydrocarbon or a saturated hydrocarbon ether, and a saturated hydrocarbon secondary alcohol, at a reaction temperature at which the reaction product condenses immediately upon the formation thereof and remains condensed while exposed to the photosensitizing radiant energy.

4,874,489
PROCESS FOR THE PRODUCTION OF CHLORINE DIOXIDE

Joseph Callerame, 2220 Casper Dr., Lake Havasu City, Ariz. 86403

Filed Jul. 11, 1988, Ser. No. 217,385
Int. Cl.[4] C01B 11/02
U.S. Cl. 204—157.44 **10 Claims**

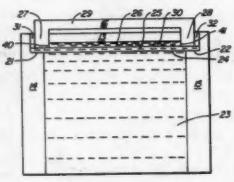


1. Process of producing chlorine dioxide which comprises introducing a chlorite into a reaction space and subjecting the chlorite to ultraviolet radiation.

4,874,490
PRE-CAST GEL SYSTEMS FOR TWO-DIMENSIONAL ELECTROPHORESIS

Denis F. Hochstrasser, Geneva, Switzerland, assignor to Bio-Rad Laboratories, Inc., Hercules, Calif.

Filed Nov. 4, 1988, Ser. No. 267,069
Int. Cl.[4] G01N *27/26*
U.S. Cl. 204—182.1 21 Claims



20. A method for separating a sample into components by two-dimensional electrophoresis, said method comprising:

(a) providing a two-dimensional electrophoresis gel arrangement comprising a first gel in the form of an elongate strip having an elongate dimension and a second gel in the form of a slab, said first and second gels retained on a single gel support means, and said first and second gels separated by an intervening region of a material which is solid at room temperature and has a melting point between about 25° C. and about 75° C.;

(b) loading said sample onto said first gel at one end thereof;

(c) imposing an electric field across said first gel in a direction parallel to said elongate dimension, to effect electroporetic seaparation therein of said components of said sample into zones;

(d) heating said nonconductive material above said melting point;

(e) removing said nonconductive material while in the liquid state; and

(f) moving said first gel toward said second gel to place said first and second gels in direct contact; and

(g) imposing an electric field across both said first and second gels in a direction transverse to said elongate dimension, to effect electrophoretic separation of said zones in said second gel.

4,874,491
METHOD OF SUPPLYING BUFFER SOLUTIONS TO ELECTROPHORETIC SEPARATION PROCEDURES

Ralph I. Stalberg, Uppsala, Sweden, assignor to Pharmacia AB, Uppsala, Sweden

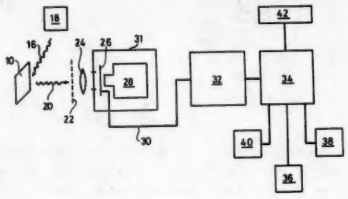
PCT No. PCT/SE87/00057, § 371 Date Sep. 14, 1987, § 102(e) Date Sep. 14, 1987, PCT Pub. No. WO87/04948, PCT Pub. Date Aug. 27, 1987
PCT Filed Feb. 19, 1987, Ser. No. 103,040
Claims priority, application Sweden, Feb. 13, 1986, 8600628
Int. Cl.[4] B01K *5/00*
U.S. Cl. 204—182.8 4 Claims

1. In the known electrophoretic separation process that involves depositing a sample volume on a gel matrix that is in contact with two electrodes and a buffer substance, then applying an electric field between two electrodes whereby charged components of the sample are caused to migrate in the gel matrix, the improvement comprising that said buffer substance is incorporated in a gel material so as to form a solid buffer gel that has good mechanical strength properties such that a supporting vessel is not required, said gel material being selected from the group consisting of agarose and a polyacrylamide.

4,874,492
ANALYSIS OF SAMPLES BY ELECTROPHORESIS USING A CHARGE COUPLED DEVICE

Craig D. Mackay, Cambridge, Great Britain, assignor to Astromed Limited, Cambridge, Great Britain

Continuation-in-part of Ser. No. 867,494, May 28, 1986, abandoned. This application Jun. 6, 1988, Ser. No. 203,482
Claims priority, application United Kingdom, May 29, 1985, 8513538
Int. Cl.[4] G01N *27/26*
U.S. Cl. 204—182.8 12 Claims



1. A method of analysing biological samples by use of electrophoresis comprising the steps of:

treating the samples with fluorescent marking material so that components of the samples are fluorescently marked;

applying the fluorescently marked samples to an electrophoretic gel;

running the gel to effect electrophoresis causing differential migration of different components;

irradiating the gel with an U/V source to render the marked components visible;

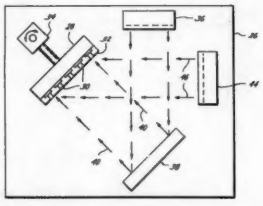
detecting the pattern of light emanating from the marked components by means of a light sensitive charge coupled device (CCD), said CCD being a silicon CCD having a two-dimensional detector array and being operated in slow scan mode; and

cooling the CCD to a temperature less than −25 degrees C. During detection.

4,874,493
METHOD OF DEPOSITION OF METAL INTO CAVITIES ON A SUBSTRATE

Ju-Don T. Pan, Austin, Tex., assignor to Microelectronics and Computer Technology Corporation, Austin, Tex.

Filed Mar. 28, 1988, Ser. No. 174,054
Int. Cl.[4] C23C *14/46;* H01L *21/88*
U.S. Cl. 204—192.11 6 Claims



1. A process for achieving the deposition of a metal into cavities in a substantially flat surface of a substrate and substan-

tially filling the cavities without leaving enclosed holes comprising,

depositing metal in the cavities and on the surface of the substrate by ion beam sputter deposition, and

simultaneously re-sputtering the deposited metal on the flat surface by ion beam milling thereby substantially completely removing the film on the flat surface without removing the metal deposited in the cavities.

4,874,494

SEMICONDUCTOR MANUFACTURING APPARATUS

Tadahiro Ohmi, 1-17-301, Komegabukuro 2-chome, Sendai-shi, Miyagi-Ken 980, Japan

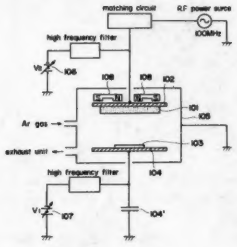
PCT No. PCT/JP87/00357, § 371 Date Feb. 5, 1988, § 102(e) Date Feb. 5, 1988, PCT Pub. No. WO87/07651, PCT Pub. Date Dec. 17, 1987

PCT Filed Jun. 6, 1987, Ser. No. 157,507

Claims priority, application Japan, Jun. 6, 1986, 61-131188

Int. Cl.[4] C23C *14/36*

U.S. Cl. 204—192.12 **5 Claims**



3. A method for depositing a thin film on a substrate surface by bias-sputtering, comprising the steps of:

mounting a target on a target electrode in a vacuum vessel;

applying a power source of high frequency greater than 100 MHz to said target and further applying a desired DC bias potential to at least one of a susceptor serving to hold said substrate and said target.

4,874,495

APPARATUS FOR PRODUCING A FIBER AGGREGATE

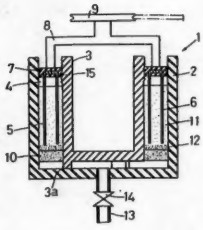
Tomohito Ito, Ohbu; Renichi Isomura, Kariya; Hidetoshi Hirai, Ichinomiya, and Fukuo Gomi, Nagoya, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan

Filed Sep. 22, 1987, Ser. No. 99,900

Claims priority, application Japan, Sep. 24, 1986, 61-225592; Mar. 11, 1987, 62-55799

Int. Cl.[4] C25D *17/10, 9/00*

U.S. Cl. 204—212 **9 Claims**



6. An apparatus for producing a fiber aggregate comprising:

a vessel having a closed base comprising an inner cylinder and a concentric outer cylinder having a central axis and including an annular space therebetween;

a plurality of electrodes, comprising positive electrodes and negative electrodes disposed alternately in the annular space at equal intervals, wherein said electrodes are selected from the group consisting of foil electrodes, mesh electrodes, electrodes comprising a plurality of substantially vertical wires disposed in a plane, and a combination thereof;

means for rotating said electrodes around the central axis of said annular space;

means for filtering disposed in a lower part of said annular space;

means for raising said electrodes in relation to accumulated height of a layer of aggregated fiber on said filtering means;

means for draining disposed at the bottom of said vessel; and

means for applying voltage connected to said electrodes.

4,874,496

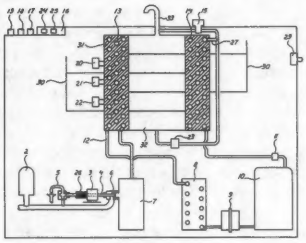
DEVICE FOR SILVERIZING DRINKING WATER

Maryan Chak, and Alexander Chak, both of 2901 Ocean Pkwy., Brooklyn, N.Y. 11235

Filed Jan. 6, 1989, Ser. No. 294,381

Int. Cl.[4] C25B *9/00, 15/00*

U.S. Cl. 204—229 **11 Claims**



1. A device for silverizing drinking water, comprising

a plurality of electrodes including electrodes composed of silver and connectable with an electrical source;

means forming an inlet and an outlet arranged so that water passes from said inlet to said outlet near said electrodes to be saturated with silver ions; and

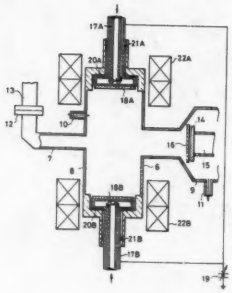
means for maintaining a desired temperature of water and including means for cooling the water and means for heating the water, and means for alternatingly activating said cooling means and said heating means in response to sensing a temperature of water.

9. A device for silverizing water as defined in claim 1; and further comprising means for activating said electrodes upon filling the water to a predetermined level and including an activating switch and a float arranged to activate said switch upon filling the water to a predetermined level and therefore raising the float to said level.

4,874,497
THIN FILM FORMING APPARATUS

Morito Matsuoka, Hitachi, and Ken'ichi Ono, Mito, both of Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan

PCT No. PCT/JP87/00759, § 371 Date Jun. 8, 1988, § 102(e) Date Jun. 8, 1988, PCT Pub. No. WO88/02791, PCT Pub. Date Apr. 21, 1988
PCT Filed Oct. 8, 1987, Ser. No. 210,511
Claims priority, application Japan, Oct. 11, 1986, 61-241740
Int. Cl.[4] C23C *14/34*
U.S. Cl. 204—298 4 Claims



1. A thin film forming apparatus comprising:

a vacuum chamber consisting of a vacuum waveguide having a microwave introduction window at one end thereof, said microwave introduction window being connected to a microwave waveguide, a plasma generation chamber having a diameter and a length sufficient to define a microwave cavity resonator for causing resonance of the introduced microwave energy, and a specimen chamber adapted to contain a specimen substrate to be coated with a thin film, all connected with each other in the order named, and further having a gas introduction inlet;

at least one pair of magnetic field generating means which are disposed around the outer side of both the end portions of said plasma generation chamber so that a mirror field is produced in such a way that the center of the magnetic field exists within said plasma generation chamber;

a pair of targets disposed within and at both ends of said plasma generation chamber perpendicular to the directions of the magnetic fluxes produced by said at least one pair of magnetic field generating means and adapted to be applied with a negative potential; and

said specimen chamber being connected to said plasma generation chamber in the direction perpendicular to said magnetic fluxes, whereby said specimen substrate is not subjected to bombardment by high energy particles.

4,874,498
APPARATUS FOR REGULATING THE CONCENTRATION OF AN OXIDIZING SOLUTION BY MEASURING THE REDOX POTENTIAL THEREOF

Jean-Michel Freal-Saison, Chatou, France, assignor to Henkel France S.A., Gentilly, France

Filed Mar. 16, 1987, Ser. No. 25,958
Claims priority, application France, Mar. 17, 1986, 86 03745
Int. Cl.[4] G01N *27/26, 27/28*
U.S. Cl. 204—400 21 Claims

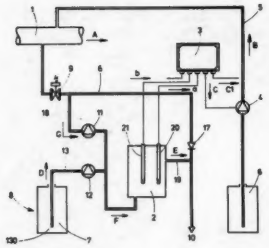
1. A system for regulating the concentration of an oxidizing solution which contains disinfecting molecules and which is circulated in a closed circuit manner in a main pipe, by measuring the Redox Potential of said oxidizing solution, comprising

a. a reservoir for a concentrated solution of disinfecting molecules connected to said main pipe by readjustment pipe means;

b. means for selectively directing said concentrated solution into said main pipe;

c. a measuring cell means having electrode means for measuring the Redox Potential and pH of the oxidizing solution;

d. a regulator responsive to said electrode means to determine a value of the concentration of the disinfecting molecules in response to signals transmitted by the electrode means, to compare said value with a control value and to control operation of the directing means so as to inject into the main pipe an adequate quantity of the concentrated solution to establish the control value in the oxidizing solution, with injection of the concentrated solution being automatically stopped when the control value is reached:



e. a secondary pipe means leading from the main pipe upstream of the readjustment pipe means relative to flow direction of the oxidizing solution, to the measuring cell means to introduce a portion of the oxidizing solution to the measuring cell means;

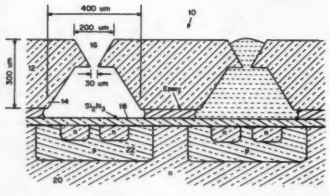
f. a reservoir means containing an adapting solution containing a reducing agent and a buffer element; and

g. means to supply said adapting solution in a given proportion to said portion of the oxidizing solution in order to reduce its redox potential to a level at which it is possible to measure, and inhibit polarization of the electrode means and buffer the pH of said portion of the oxidizing solution.

4,874,499
ELECTROCHEMICAL MICROSENSORS AND METHOD OF MAKING SUCH SENSORS

Rosemary L. Smith, and Scott D. Collins, both of Newton, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed May 23, 1988, Ser. No. 197,561
Int. Cl.[4] G01N *27/30*
U.S. Cl. 204—403 40 Claims



1. An electrochemical microsensor comprising:

a substrate containing microelectronic means for sensing potential or current;

a micromachined structure having openings extending into a cavity therein from opposite sides of the structure, wherein said structure has been produced by photolithographic transfer of a two dimensional pattern onto a material to form a three dimensional structure following selective removal of the material; and

wherein the structure containing the cavity has been positioned over the substrate so that an opening into the cavity extends over the sensing means and the cavity containing structure has been adhered to the substrate using a process which simultaneously adheres multiple structures to substrates as a single unit, with an adhesive forming a seal between the substrate and structure at a temperature less than approximately 400° C.

23. A method for manufacturing a chemical microsensor comprising:

(i) providing a substrate containing microelectronic means for sensing potential or current;

(ii) providing a micromachined structure having openings extending into a cavity therein from opposite sides of the structure, wherein said structure has been produced by photolithographic transfer of a two dimensional pattern onto a material to form a three dimensional structure following selective removal of the material, and;

(iii) positioning the structure containing the cavity over the substrate wherein an opening into the cavity extends over the sensing means; and

(iv) using a process to adhere the cavity containing structure to the substrate which simultaneously adheres multiple structures to substrates as a single unit, at a temperature less than approximately 400° C.

4,874,500

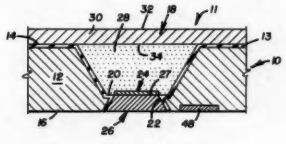
MICROELECTROCHEMICAL SENSOR AND SENSOR ARRAY

Marc J. Madou, Palo Alto, and Takaaki Otagawa, Fremont, both of Calif., assignors to SRI International, Menlo Park, Calif.

Filed Jul. 15, 1987, Ser. No. 73,805

Int. Cl.[4] G01N *27/30*

U.S. Cl. 204—412 **54 Claims**



1. A microelectrochemical electrode structure, comprising:

a monolithic substrate having a front surface and a back surface facing generally away from one another, a first well extending into said substrate from said front surface towards said back surface and ending in a first well bottom, and a first passage extending into said substrate from said back surface to said first well bottom;

a first electrode wholly between said front and back surfaces of said substrate; and

a first conductor in said first passage electrically communicating said first electrode to adjacent said back surface.

4,874,501

MEMBRANE FOR AN ELECTROCHEMICAL MEASURING ELECTRODE DEVICE

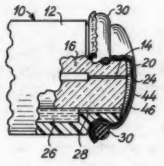
Torben F. Christiansen, Holte, and Finn Kokholm, Copenhagen, both of Denmark, assignors to Radiometer A/S, Copenhagen, Denmark

Division of Ser. No. 106,959, Oct. 14, 1987, Pat. No. 4,780,192, which is a continuation of Ser. No. 875,645, Jun. 18, 1986, abandoned. This application Jun. 29, 1988, Ser. No. 213,243

Claims priority, application Denmark, Jun. 18, 1985, 2738/85

Int. Cl.[4] G01N *27/42*

U.S. Cl. 204—415 **12 Claims**



1. A membrane for an electrochemical measuring electrode device for polarographically measuring the partial pressure of oxygen in a medium, said membrane being a foil-shaped plastic material permeable to oxygen and being provided with a coating on at least part of the surface of said membrane, said coating comprising a particulate non-silver noble metal catalytic means effective for promoting the decomposition of H_2O_2, the non-silver noble metal particles of the catalytic means being substantially constituted by particles having a cross-sectional area of less than 1 μm.

4,874,502

METHOD OF PURIFYING COAL TARS FOR USE IN THE PRODUCTION OF CARBON PRODUCTS

Masatoshi Tsuchitani, Ichihara, and Sakae Naito, Chiba, both of Japan, assignors to Maruzen Petrochemical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 936,978, Nov. 28, 1986, abandoned, which is a continuation-in-part of Ser. No. 850,143, Apr. 10, 1986, abandoned. This application Jul. 19, 1988, Ser. No. 220,908

Claims priority, application Japan, Apr. 16, 1985, 60-80793

Int. Cl.[4] C10C *1/08, 1/04;* D01F *9/12, 9/14*

U.S. Cl. 208—45 **4 Claims**

1. A method of preparing a starting material for use in the production of a carbon product, said method comprising the following steps:

distilling or flash distilling coal tars, containing light component having an initial boiling point of not more than 280° C. at atmospheric pressure with a fraction in an amount of at least 10% by weight which has a boiling point between the initial boiling point and 350° C. at atmospheric pressure and xylene-insoluble components in an amount of 15% or less by weight, to remove said light component; said distilling or flash distilling being performed at a temperature of 250° C. to 350° C. to prevent substantially all thermally induced condensation, polymerization or decomposition reactions;

obtaining a heavy component which remains in the bottom of the distillation or flash column; said heavy component having a greater xylene-insoluble content of at least 1% and not more than 10% by weight than that of said coal tar; and having a xylene-insoluble content of not more than 20% by weight of said heavy component;

dissolving the obtained heavy component in 1–3 times its amount of a monocyclic aromatic hydrocarbon solvent to form a solution at a temperature ranging from ambient temperature to the boiling point of said solvent and which

imparts flowability to said heavy component under atmospheric pressure or application of pressure;

separating and eliminating the insoluble component from the resulting solution by filtration or centrifugation, which insoluble component comprises free carbon and components having very high molecular weights; and

subsequently eliminating the solvent by distillation so as to obtain a purified heavy component substantially being free of the above insoluble component, as said starting material.

4,874,503

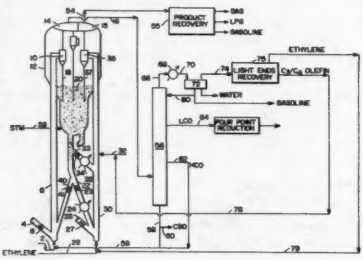
MULTIPLE RISER FLUIDIZED CATALYTIC CRACKING PROCESS EMPLOYING A MIXED CATALYST

Joseph A. Herbst, Turnersville; Hartley Owen, Belle Mead, both of N.J., and Paul H. Schipper, Wilmington, Del., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 144,731, Jan. 15, 1988, abandoned, which is a continuation of Ser. No. 903,352, Sep. 3, 1986, abandoned. This application Dec. 22, 1988, Ser. No. 291,411

Int. Cl.[4] C10G *57/00*; C07C *2/02*

U.S. Cl. 208—67 **22 Claims**



1. A fluidized catalytic cracking (FCC) process for cracking in a first riser reactor a heavy feed to cracked products comprising lighter products including light olefins comprising ethylene, and olefinic gasoline over a catalyst mixture comprising a FCC catalyst and a shape selective zeolite additive said process characterized by:

(a) recovering as a product the gasoline fraction produced by riser cracking of the heavy feed in the first riser;

(b) recovering an ethylene rich charge material consisting essentially of catalytically cracked products and comprising at least 10 weight percent ethylene and the balance comprising propylene and butylene and mixtures thereof;

(c) separately recovering a light olefinic feed with a higher boiling point than the ethylene rich material, comprising C_3 and C_4 olefins and mixtures thereof;

(d) contacting in the base of a second riser reactor a feed consisting essentially of the ethylene rich charge material with the FCC catalyst and shape selective zeolite additive at a temperature of 400°–750° F.;

(e) converting in an exothermic conversion reaction a majority of the ethylene rich charge material in the base of the second riser to C_5+as an intermediate product;

(f) contacting the mixture of C_5+*intermediate product and catalyst with the light olefinic feed comprising* C_3 and C_4 olefins and mixtures thereof;

(g) reacting the C_5[30] intermediate product with the light olefinic feed to form high octane gasoline which is discharged from the second riser.

4,874,504

PH CONTROL BY BULKY ORGANIC BASES DURING NOBLE-METAL EXCHANGE OF ZEOLITE CATALYSTS

Roland von Ballmoos, Hopewell, and Francis X. Ryan, Lambertville, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 139,211, Dec. 29, 1987, Pat. No. 4,814,306. This application Mar. 20, 1989, Ser. No. 325,636

Int. Cl.[4] C10G *11/05, 35/095*; C07C *2/12, 5/22*

U.S. Cl. 208—111 **26 Claims**

1. A process for the conversion of hydrocarbons comprising the steps of contacting said hydrocarbons with a composite catalyst under conversion conditions which catalyst comprises a noble metal-containing zeolite prepared by a method comprising:

(a) mixing a zeolite with water to form an aqueous suspension;

(b) adjusting the pH of the aqueous suspension of step (a) to between about 4 and about 11 with an organic base of a size sufficient to prevent entry of the organic cations into the pores of the zeolite catalyst;

(c) adding to the suspension of step (b) an aqueous noble-metal salt solution;

(d) maintaining the pH of the mixture of step (c) at a uniform value between about 4 and about 11 by the controlled addition of the organic base of step (b), above;

(e) filtering the zeolite-water suspension of step (c) to separate the solid zeolite material; and

(f) drying the solid zeolite material.

4,874,505

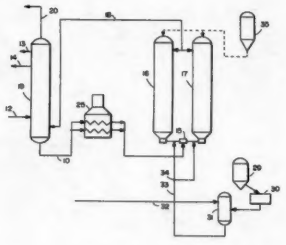
RECYCLE OF OILY REFINERY WASTES

Mark P. Bartilucci, Clementon; Grant G. Karsner, Voorhees Township, Camden County, and William J. Tracy, III, Sewell, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Feb. 2, 1988, Ser. No. 151,380

Int. Cl.[4] C10G *9/14, 17/00*

U.S. Cl. 208—131 **13 Claims**



1. A process for recycling of petroleum containing sludge comprising:

(a) segregating waste oil-containing sludges into a relatively high oil content sludge and a relatively high water content sludge;

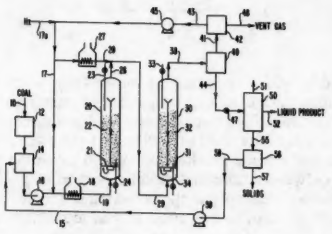
(b) introducing the high oil content sludge into a delayed coking drum under delayed coking conditions in the presence of a liquid coker hydrocarbon feedstock to form coke;

(c) introducing the high water content sludge into a delayed coking drum to quench the coke formed in the coking drum.

4,874,506
CATALYTIC TWO-STAGE COAL HYDROGENATION PROCESS USING EXTINCTION RECYCLE OF HEAVY LIQUID FRACTION

James B. MacArthur, Denville, N.J.; Alfred G. Comolli, Yardley, Pa., and Joseph B. McLean, Somerville, N.J., assignors to HRI, Inc., Lawrenceville, N.J.

Continuation-in-part of Ser. No. 876,307, Jun. 18, 1986, which is a continuation of Ser. No. 725,458, Apr. 22, 1985, abandoned. This application Oct. 16, 1987, Ser. No. 109,646
The portion of the term of this patent subsequent to Aug. 1, 2006, has been disclaimed.
Int. Cl.[4] C10G *1/00*
U.S. Cl. 208—413 14 Claims



1. A process for catalytic two-stage hydrogenation of coal with selective liquid recycle to produce increased yields of low-boiling hydrocarbon liquid and gaseous products, comprising:

(a) feeding particulate coal and a hydrocarbon slurrying oil at an oil:coal weight ratio between 1.0 and 4.0 and a temperature below a distillation cut point temperature of 600°–750° F. into a pressurized first stage catalytic reaction zone containing coal-derived liquid and hydrogen and an ebullated bed of particulate hydrogenation catalyst;

(b) passing said coal and hydrogen upwardly through said first stage ebullated bed of particulate hydrogenation catalyst, said bed being maintained at 700°–800° F. temperature, 1000–4000 psig hydrogen partial pressure and space velocity of 10–90 lb coal/hr per ft^3 catalyst settled volume to rapidly heat the coal and catalytically hydrogenate it to produce a partially hydrogenated and hydroconverted coal-derived material;

(c) withdrawing said partially hydrogenated coal-derived material containing gas and liquid fractions from said first stage reaction zone, and passing said material directly to a close-coupled second stage catalytic reaction zone together with additional hydrogen, said second stage reaction zone being maintained at 760°–860° F. temperature and 1000–4000 psig hydrogen partial pressure for further reacting and hydrocracking the liquid fraction material therein with minimal dehydrogenation reactions to produce gas and lower boiling hydrocarbon liquid materials;

(d) withdrawing from said second stage catalytic reaction zone the hydrocracked material containing gas and liquid fractions, and phase separating said material into separate gas and liquid fractions;

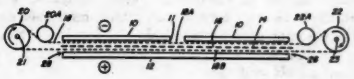
(e) distilling said liquid fraction at 600°–750° F. temperature and passing the distillation bottoms from said distillation to a liquid-solids separation step, from which a liquid stream normally boiling above the 600°–750° F. distillation temperature and containing less than about 20 W % concentration of particulate solids is entirely extinction recycled to the coal slurrying step, and a stream containing an increased solids concentration and substantially no hydrocarbon liquid material is removed from said liquid-solids separation step as the sole additional stream resulting from said liquid-solids separation step; and

(f) recovering hydrocarbon gas and low boiling C_4-750° F. fraction hydrocarbon liquid products from the process.

4,874,507
SEPARATING CONSTITUENTS OF A MIXTURE OF PARTICLES

David R. Whitlock, 138 Vassal La., Cambridge, Mass. 02138

Continuation-in-part of Ser. No. 872,082, Jun. 6, 1986. This application Mar. 29, 1988, Ser. No. 174,601
Int. Cl.[4] B03C *9/00*; B01D *17/00*
U.S. Cl. 209—11 42 Claims



1. A method of separating different components of a mixture of a material in a separation chamber without requiring pneumatic, hydraulic or gravitational conveyance comprising the steps of:

a. admitting said material into the separation chamber, said separation chamber having means defining confronting surfaces spaced more closely than the respective lengths of said confronting surfaces;

b. impressing a separation influence toward at least one of said confronting surfaces of said separation chamber wherein said separation influence is chosen from the list of electric field, electric field gradient, magnetic field, magnetic field gradient, shear field, acceleration field, temperature gradient, vibration, gravitation field, flow field, shear gradient, concentration gradient, chemical affinity;

c. separating said different components in the direction of said separation influence according to their relative influencability to said separation influence;

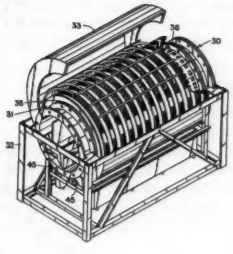
d. mechanically moving components of like net influencability in streams each of unlike net influencability near each other transversely to said separation influence, said streams being in communication parallel to said separation influence, so as to transfer a portion of at least one of said components to another of said respective streams of virtue of the continued action of said separation influence as said streams progress transversely to said separation influence;

e. removing separated streams from said separation chamber.

4,874,508
MAGNETIC SEPARATOR

Alan J. Fritz, Grand Rapids, Minn., assignor to Magnetics North, Inc., Grand Rapids, Minn.

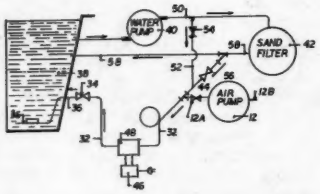
Filed Jan. 19, 1988, Ser. No. 146,039
Int. Cl.[4] B03C *1/14*
U.S. Cl. 209—214 30 Claims



1. A magnetic separator device comprising:

(a) at least one race having first and second opposite sidewalls and matrix material positioned therebetween, said race opposite sidewalls being flexible and selectively deformable toward and away from one another;
(b) expansion means selectively expanding at least a portion of said matrix material from a more dense orientation to a less dense orientation;
(c) motive means selectively rotating said race through a 360° arc about a central-axis-of rotation;
(d) ore-slurry feed means for selectively feeding an ore-slurry into said matrix material;
(e) a magnetic zone including a first magnetic field applied across said race during a first selected portion of the 360° arc-of-rotation, to selectively retain magnetic material from the ore-slurry feed in said matrix materials; and
(f) a release zone comprising a selected portion of said 360° arc-of-rotation at which no substantial magnetic field is applied across said race.

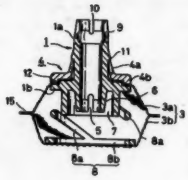
4,874,509
OXIDATION SATURATION DEVICE
Donald Bullock, 31 Logging Hill Rd., Concord, N.H. 03301
Filed Apr. 24, 1987, Ser. No. 42,419
Int. Cl.[4] B01F *3/04*; C02C *5/06*
U.S. Cl. 210—169 **1 Claim**



1. An apparatus for dissolving air in water circulated in a swimming pool, said swimming pool having a water filter and a circulating pump, said apparatus comprising:
a pool water circulating pipe connecting the pool pump, the filter and an inlet and outlet to the pool;
means for supplying air under pressure into water circulating in said pool water circulating pipe; said circulating pipe including a substantially long tube connected downstream of said means for supplying and for transporting a mixture of air and pool water, said tube having a length of at least about 25 feet to ensure optimum dissolution and saturation of the air into the water;
a means for generating an alternating electrical or magnetic field in said mixture circulated in said pool water circulating pipe; and
a back pressure valve means for maintaining a predetermined air-water pressure in said tube to achieve dissolution and saturation of the air into the water in said tube, said circulating pipe including an outflow end distributor means located at the bottom of said pool for introducing a supersaturated air-water mixture into said pool.

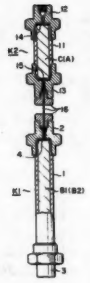
4,874,510
FILTER FOR FUEL TANK
Mizusawa Akira, and Kazumasa Kurihara, both of Yokohama, Japan, assignors to Nifco Inc., Yokohama, Japan
Continuation of Ser. No. 946,819, Dec. 29, 1986, abandoned. This application Apr. 7, 1988, Ser. No. 180,704
Claims priority, application Japan, Jan. 17, 1986, 616271
Int. Cl.[4] B01D *35/02*
U.S. Cl. 210—172 **5 Claims**

1. A fuel tank filter comprising: a mounting member provided on one end thereof with a cylindrical portion having a central bore for through passage of a fuel suction pipe and on the other end thereof with a squeezing portion having at least one slit for gripping securement to the pipe;
a filter net member acting alone to filter fuel and having an opening fitter on and fastened to said mounting member; and
shape retaining means formed integrally with and supported by said mounting member, and disposed inside said net



member, said shape retaining means comprising resilient means arranged in annular pattern engaging and resiliiently maintaining a circular portion of said filter net member substantially flat, said filter net member extending from said circular portion toward said mounting member and outwardly from said circular portion to a margin of maximum diameter and then tapering inwardly from said margin of maximum diameter to said mounting member.

4,874,511
APATITE CHROMATOGRAPHY COLUMN SYSTEM
Tsutomu Kawasaki, Tokyo, and Wataru Kobayashi, Tsuruoka, both of Japan, assignors to Koken Co., Ltd., Tokyo, Japan
Continuation of Ser. No. 21,702, Mar. 4, 1987, abandoned. This application Oct. 19, 1988, Ser. No. 259,767
Claims priority, application Japan, Mar. 7, 1986, 61-49699
Int. Cl.[4] B01D *15/08*
U.S. Cl. 210—198.2 **6 Claims**



1. A column system for use in chromatography comprising:
a main column packed with an adsorbent composed of secondary particles formed by aggregation of fine primary hydroxyapatite crystal particles,
said secondary particles having been sintered, wherein a sintering bond is formed between the aggregated fine primary hydroxyapatite crystal particles; and
a precolumn provided at the fluid inlet into said main column so as to be connected in communication with or disconnected from said main column packed with a second adsorbent consisting of hydroxyapatite crystal particles having resistivity to the chemical and physical loads applied from the fluid introduced into the column,
said second adsorbent being either of a first type hydroxyapatite crystal particles or a second type hydroxyapatite crystal particles,
wherein said first type hydroxyapatite crystal particles hav-

ing been produced by having an alkali act on crystal particles of brushite used as the starting material, and

said second type hydroxyapatite crystal particles having been produced by the steps of heating brushite crystal particles used as the starting material, to a temperature range of not lower than the dehydration transition temperature and not higher than the decomposition temperature thereof, to cause dehydration and phase transition of the brushite crystal particles, and thus producing monetite crystal particles, and subsequently acting an alkali on the thus produced monetite crystal particles to produce hydroxyapatite substantially monocrystal particles.

4,874,512

FILTER PRESS CLOTH HANGER

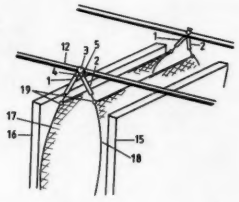
Douglas W. Brown, Staffordshire, England, assignor to Coal Industry (Patents) Limited, London, England

Filed Aug. 10, 1988, Ser. No. 230,423

Claims priority, application United Kingdom, Sep. 3, 1987, 8720722

Int. Cl.[4] B01D *25/32*

U.S. Cl. 210—225 **13 Claims**



1. A filter press cloth hanger for a filter press comprising a pair of arms hingedly connected at their upper ends an each including at their lower ends latching means for attaching each arm to a respective filter cloth suspension member to the lower end of the arm in a filter press, each of said arms including spring loaded extendable means carrying the latching means and means for suspending the cloth hanger above the filter press via the hinged connection.

4,874,513

DISPOSABLE FILTER UNIT WITH FILTER SUPPORT MEANS AT BOTH SIDES OF THE FILTER ELEMENT

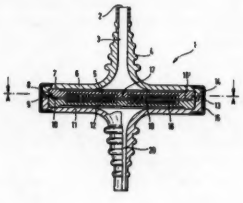
Asok Chakraborty, Gottingen; Herbert Urlaub, Einbeck; Franz Grof, and Klaus Cosack, both of Dassel, all of Fed. Rep. of Germany, assignors to Schleicher & Schuell GmbH, Fed. Rep. of Germany

Filed Jan. 19, 1989, Ser. No. 300,232

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1988, 3801866

Int. Cl.[4] B01D *27/08, 29/04*

U.S. Cl. 210—321.84 **5 Claims**



1. A disposable filter unit comprising a pair of housing parts connected together, wherein each housing part includes a centrally arranged connecting sleeve serving as one of an inlet for fluid to be treated and an outlet for the filtrate, respectively, a filter support means for supporting a filter element arranged betwen said filter support means, said filter support means including:

a pair of grate-shaped filter supports (5,12) having concentrically arranged substantially coplanar circular webs (16);

a baffle plate (17) arranged centrally with respect to the webs (16) and substantially coplanar therewith;

radially extending supports webs (18) to which webs (16) and the baffle plate (17) are fixed at a side of the filter support facing away from the filter element;

a broad support area defined by a ring-type web (16') located peripherally about the support webs;

said filter supports including lipped edges (9,10) at the peripheral ring-type webs (16') interlocking with each other in a fluid-tight and form locking manner while simultaneously fixing the filter element between the filter supports;

wherein peripheral edges (13,14) of the housing parts (6,11) including means for interlocking with each other in a fluid-tight and form locking manner, and

said connecting sleeves (3,20) having funnel-shaped inlet and outlet fluid flow passages arranged such that the filter support means comes into contact with the housing parts (6,11) only at peripheral areas (7,8) thereof.

4,874,514

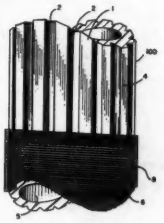
TUBULAR ELEMENT FOR REVERSE OSMOSIS WATER PRUIFICATION

Walter P. Casey Jr., Las Vegas, Nev., assignor to Wetco of Delaware, Inc., Decatur, Ga.

Continuation-in-part of Ser. No. 567,184, Dec. 30, 1983, Pat. No. 4,715,952, which is a continuation of Ser. No. 357,213, Mar. 11, 1982, abandoned. This application Jun. 20, 1984, Ser. No. 622,499

Int. Cl.[4] B01D *13/01*

U.S. Cl. 210—321.87 **12 Claims**

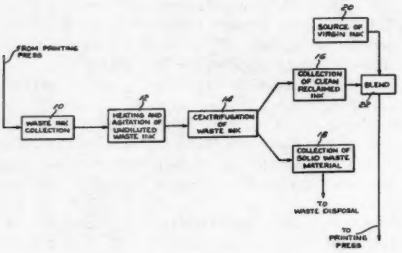


1. An element for reverse osmosis purification of an aqueous fluid comprising a rigid, impermeable, straight, elongate, hollow cylindrical tubular member, said member having a plurality of substantially parallel grooves circumferentially spaced around the external periphery of the tubular member, each groove extending substantially the entire length of the tubular member, a single elongate fiber having a substantially circular cross-section wrapped helically around the external periphery of the tubular member substantially along the entire length of said member, each turn being substantially uniformly spaced apart from each adjacent turn by a distance of from about $\frac{1}{2}$ to about $\frac{3}{4}$ of the fiber diameter, and a reverse osmosis membrane supported on the fiber.

4,874,515
INK RECLAMATION SYSTEM

John L. McKelvey, Lakeland, Fla., assignor to The Ink Company, W. Sacramento, Calif.

Division of Ser. No. 137,235, Dec. 22, 1987, Pat. No. 4,818,284.
This application Oct. 13, 1988, Ser. No. 257,290
Int. Cl.[4] B01D *17/038;* C09D *11/02*
U.S. Cl. 210—360.1 16 Claims



1. A system comprising: means for reclaiming undiluted waste ink containing solid and liquid contaminants, including,

a first vessel means for storing, heating and agitating undiluted waste ink, said first vessel including means to maintain said undiluted waste ink at sufficient temperature, and under sufficient agitation for sufficient time to cause volatilization of at least some of said liquid contaminants therefrom;

a centrifuge means fluidly connected to said first vessel means, said centrifuge means, including means to receive said heated and agitated undiluted waste ink from and to separate said solid contaminants therefrom, thereby providing an undiluted liquid clarified ink fraction and a solid contaminant fraction; and

a second vessel means including means to subsequently collect and blend said undiluted clarified ink with a sufficient quantity of virgin ink to form a clarified ink/virgin ink mixture having desirable properties.

7. A system comprising: means for reclaiming undiluted waste ink containing solid and liquid contaminants, including,

a first vessel means for storing, heating and agitating undiluted waste ink, said first vessel including means to maintain said undiluted waste ink at sufficient temperature, and under sufficient agitation for sufficient time to cause volatilization of at least some of said liquid contaminants therefrom;

a centrifuge means fluidly connected to said first vessel means including means to receive said heated and agitated undiluted waste ink from said first vessel means and to separate therefrom said solid contaminants, thereby providing an undiluted liquid clarified ink fraction and a solid contaminant fraction; and

a second vessel mans including means to subsequently collect and blend said undiluted clarified ink with a sufficient quantity of virgin ink to form a clarified ink/virgin ink mixture having desirable properties.

4,874,516
A CERAMIC FILTER FOR SEMI-ULTRAFILTRATION

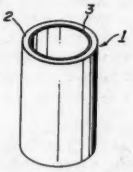
Kuniharu Kondo, Nagoya, Japan, assignor to NGK Insulators, Ltd., Nagoya, Japan

Filed Dec. 23, 1985, Ser. No. 812,056
Claims priority, application Japan, Dec. 29, 1984, 59-279080
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—490 9 Claims

1. A filter comprising:

a substrate consisting essentially of a ceramic porous material, said ceramic porous material having an average pore diameter of between about 0.5 microns and about 10 microns and having a pore volume of 30–50% based on an apparent volume of the substrate; and

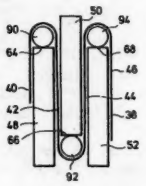
a microporous membrane consisting essentially of a high polymeric resin having an average pore diameter of about 0.1 microns to about 1 micron, said membrane covering at least one surface of said ceramic porous material to a thickness of about 30–500 microns above said at least one surface and said membrane partly permeating into said ceramic porous material, thereby forming an intermediary layer between said ceramic porous material and said microporous membrane.



4,874,517
FILTER ARRANGEMENT WITH PLEAT DISTANCE PIECE

Hans W. Esch, Altenhasslau, Fed. Rep. of Germany, assignor to AVK Filtertechnik GmbH, Hasselroth, Fed. Rep. of Germany

Filed Jul. 20, 1987, Ser. No. 75,466
Int. Cl.[4] B01D *27/06*
U.S. Cl. 210—493.5 7 Claims



1. A filter arrangement comprising:

a pleated filter means including a plurality of adjacent sections extending parallel to each other; and

a distance piece consisting essentially of a sheet of material having essentially continuous zigzag folds in a longitudinal direction and defining essentially longitudinal zigzag edges, said distance piece extending between and uniformly supporting each of said adjacent sections, and a cap extending along the plane defined by one of said zigzag longitudinal edges, said cap having a maximum width corresponding to the width of said zigzag folds and being detachably arranged on said one of said zigzag longitudinal edges, said cap supporting said filter means and being essentially free of edges in the range supporting said filter means.

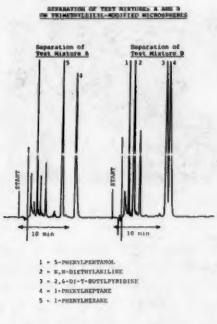
4,874,518
POROUS SILICA MICROSPHERES HAVING A SILANOL ENRICHED SURFACE

Joseph J. Kirkland, Wilmington, Del., and Jürgen Köhler, Waltrop, Fed. Rep. of Germany, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 117,430, Nov. 6, 1987, abandoned, which is a continuation of Ser. No. 798,332, Nov. 1, 1985, abandoned. This application Dec. 21, 1988, Ser. No. 287,650

Int. Cl.[4] B01D *15/08*

U.S. Cl. 210—502.1 **17 Claims**



10. A chromatographic material comprising improved porous silica microspheres having an average diameter of 0.5 to about 35 μm, substantially all of said microspheres having a diameter ranging from about 0.5 to about 1.5 times said average diameter; said microspheres consisting essentially of a plurality of substantially uniform-size colloidal particles, having a silica surface, arranged in an interconnected three-dimensional lattice; said colloidal particles occupying less than about 50 volume percent of said microspheres with the remaining volume being occupied by interconnected pores having a substantially uniform pore size distribution; said microspheres having a completely silanized surface, wherein the microspheres are prepared according to a process comprising:

(a) contacting heat strengthened thermally-dehydroxylated porous silica microspheres having surface concentration of silanol groups of less than about 5.5 umol/m^2 with water in the presence of HF or at least one basic activator selected from the group consisting of quaternary ammonium hydroxides, ammonium hydroxide, and organic amines at a temperature of about ambient temperature to about 100° C. for sufficient time to generate a surface concentration of silanol groups of from about 8 to about 16 μmol/m^2; and

(b) contacting the porous silica microspheres prepared in step (a) with a silanizing agent at a temperature of from about 25° to about 100° C. for sufficient time to generate a completely silanized surface.

4,874,519
PROCESS FOR TREATING WASTEWATER

Ronald E. Williamson, Hillsborough, N.C., assignor to Orange Water & Sewer Authority, Carrboro, N.C.

Continuation-in-part of Ser. No. 201,185, Jun. 2, 1988, abandoned. This application Aug. 30, 1988, Ser. No. 238,059

Int. Cl.[4] C02F *3/30*

U.S. Cl. 210—605 **22 Claims**

1. A method of removing phosphorus and other pollutants from a pretreated wastewater stream having a relatively low BOD to phosphorus ratio comprising:

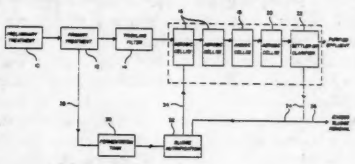
a. separating suspended solids from the wastewater stream and conveying the suspended solids into a fermentation tank and the liquid fraction of the wastewater to further treatment;

retaining the suspended solids in the fermentation tank a sufficient time to permit hydrolysis of the suspended solids so as to form soluble substrates;

c. producing a side stream of return activated sludge;

d. dividing the side stream of return activated sludge into at least two streams;

e. mixing soluble substrates with the return activated sludge of one stream while generally separating the return activated sludge of the other stream from initial contact with the soluble substrates so as to effectively increase the food to mass ratio of the return activated sludge of the stream initially mixed with the soluble substrates;



f. mixing the soluble substrates with return activated sludge and holding the mixture for a selected time period under anaerobic conditions to form conditioned return activated sludge;

g. passing the liquid effluent from the primary treatment through a fixed film reactor and producing a pretreated wastewater effluent having a relatively low BOD to phosphorus ratio;

h. mixing the low BOD to phosphorus effluent with the conditioned return activated sludge; and

i. passing the mixture of pretreated effluent and return activated sludge through a series of treatment zones to effectuate the removal of phosphorus and other pollutants.

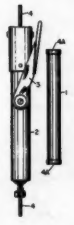
4,874,520
CHROMATOGRAPHIC PROCESS

Siu-Leung Lee, Upper Arlington, Ohio, assignor to Battelle Development Corporation, Columbus, Ohio

Division of Ser. No. 855,544, Apr. 23, 1986, abandoned. This application Jun. 23, 1988, Ser. No. 210,595

Int. Cl.[4] B01D *15/08*

U.S. Cl. 210—635 **2 Claims**



1. An improved process for separating ionizable chemical substances from a solution mixture by ion exchange chromatography of the type using a stationary phase consisting of a chemically modified support material capable of reversibly fixing macromolecules wherein the improvement comprises:

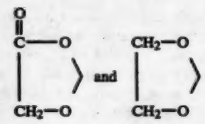
providing a hydroxy bearing support material,

reacting the support material with an organotitanate of the formula,

$$R_n—Ti—R'_{4-n}$$

wherein n is 1,2, or 3,

wherein R_n is a hydrolyzable group linked to titanium through oxygen and is selected from the group consisting of alkoxy,



wherein R' is a hydrophobic organofunctional group linked to titanium through oxygen and is each independently selected from alkoxy, arylalkoxy, alkyl ester, acrylate, methacrylate, alkenylester, alkyl phosphato, alkyl pyrophosphato, aminoalkoxy, aminoalkylarylester and quaternary ammonium salt,

contacting the organotitanate reacted support material with a solution mixture of chemical substances one constituent of which has an ionizable functionality so as to reversibly fix the chemical substance with ionizable functionality to the organotitanate reacted support material,

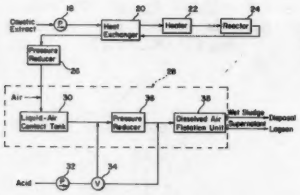
eluting the fixed ionizable chemical substance with an ionic solution.

4,874,521

PULP MILL EFFLUENT COLOR REMOVAL PROCESS

Harold L. Newman; William S. Adams, Jr., both of DeRidder, and Brace Boyden, Ruston, all of La., assignors to Boise Cascade Corporation, Boise, Id.

Filed Oct. 18, 1988, Ser. No. 259,203
Int. Cl.[4] C02F 1/52
U.S. Cl. 210—639 **14 Claims**



1. A method for removing color from the caustic effluent produced during kraft pulping and bleaching, comprising the steps of

(a) increasing the pressure of the effluent to between 200 and 600 psi to prevent the liquid within the effluent from changing phase;

(b) heating the effluent to a temperature between 200° and 250° C. for a retention time up to 20 minutes in accordance with said temperature to alter the chemical structure of lignin chromophores in the effluent;

(c) cooling the effluent to a temperature between 35° and 60° C.;

(d) reducing the pressure of the effluent to between 0 to 10 psi;

(e) lowering the pH of the effluent to between 2.6 and 3.8 to initiate flocculation of said altered chromophores in the effluent; and

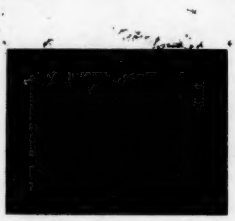
(f) separating said chromophores from the effluent.

4,874,522

POLYSULFONE HOLLOW FIBER MEMBRANE AND PROCESS FOR MAKING THE SAME

Takehiko Okamoto; Akio Ohmory; Akinori Sueoka; Ichiro Kawata, and Hiroyuki Akasu, all of Kurashiki, Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed Jun. 10, 1988, Ser. No. 205,079
Claims priority, application Japan, Jun. 12, 1987, 62-147306
Int. Cl.[4] B01D 13/00
U.S. Cl. 210—645 **20 Claims**



1. A hollow fiber membrane comprising a polysulfone hollow fiber having on its inner surface a dense skin layer having no pores observable even with a scanning electron microscope (SEM) of magnification of 10,000, on its outer surface micropores having an average pore diameter of 500 to 5000 Å at a fractional surface porosity of 5 to 50%, and a microporous structure inside said membrane, said membrane exhibiting properties which render it suitable for filtering body fluids and having permeabilities of serum albumin and inulin of not more than 10% and not less than 50% respectively, and a water permeability of not less than 60 ml/mm $Hg.m^2.Hr$.

8. A process for manufacturing a polysulfone hollow fiber membrane, which comprises extruding a dope prepared by dissolving a polysulfone and a polyethylene glycol in a solvent selected from the group consisting of N-methylpyrrolidone, dimethylacetamide and dimethyl sulfoxide, which are common solvents for polysulfone and polyethylene glycol, through an annular orifice into a hollow fiber; said process further comprising extruding said dope having incorporated said polyethylene glycol in an amount of at least 80% by weight based on the weight of said polysulfone sufficient to preclude phase separation even when said dope is heated to 100° C., at a nozzle draft of at least 1.6 into a gaseous atmosphere temperature and moisture conditioned for dry-jet-wet spinning, effecting dry-jet-wet spinning and thus forming a polysulfone hollow fiber membrane exhibiting properties which render it suitable for filtering body fluids.

19. A method comprising: treating body fluid, by contacting said fluid with a polysulfone hollow fiber membrane comprising on its inner surface of a dense skin layer having no pores observable even with an scanning electron microscope (SEM) of magnification 10,000, on its outer surface micropores having an average pore diameter of 500 to 5,000 Å at a fractional surface porosity of 5 to 50%, and a microporous structure inside said membrane, and having permeabilities for serum albumin, inulin and β_2-microglobulin of not more than 10%, not less than 50% and 0 respectively, and a water permeability of not less than 60 ml/mm$Hg.m^2.Hr$.

20. An apparatus comprising: means for treating body fluid prepared by bundling a plurality of polysulfone hollow fiber membranes each comprising on its inner surface of a dense skin layer having no pores observable even with an scanning electron microscope (SEM) of magnification 10,000, on its outer surface micropores having an average pore diameter of 500 to 5,000 Å at a fractional surface porosity of 5 to 50%, and a microporous structure inside said membrane, and having permeabilities abilities for serum albumin, inulin and β_2-microglobulin of not more than 10%, not less than 50% and 0 respectively, and a water permeability of not less than 60 ml/mm$Hg.m^2.Hr$, placing the bundle in a housing fitted with

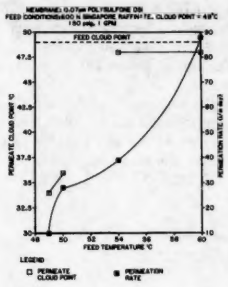
openings for introducing and discharging body fluid therethrough and fixing with a thermosetting resin the both ends of the bundles, while keeping the both ends open, to said housing.

4,874,523

METHOD FOR REDUCING THE CLOUD POINT OF MATERIALS USING AN ULTRAFILTRATION SEPARATION PROCESS

Lucie Y. LaFreniere, Brights Cove, Canada, assignor to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Aug. 12, 1988, Ser. No. 231,332
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—651 9 Claims



1. A method comprising: separating the components of mixtures, solutions or melts containing said components which crystallize at different temperatures by chilling said mixture, solution or melt to a temperature about 3° C. or less but above the liquid/solid phase transition temperature of the higher melting component to produce crystallites or submicro crystals of said higher melting component in the mixture, solution or melt and ultrafiltering the resulting chilled mixture, solution or melt to recover a permeate containing less of the higher melting component than the feed and a retentate enriched in the higher melting component in comparison to the feed.

4,874,524

SEPARATION OF ADSORBED COMPONENTS BY VARIABLE TEMPERATURE DESORPTION

Athanasios I. Liapis; Marshall E. Findley, both of Rolla, Mo., and Hoa T. Nguyen, San Jose, Calif., assignors to The Curators of the University of Missouri, Columbia, Mo.

Filed Mar. 30, 1988, Ser. No. 175,329
Int. Cl.[4] B01D *15/08, 53/04*
U.S. Cl. 210—672 20 Claims

1. A process for the separation of ethanol from an ethanol-water mixture comprising about 2 to about 50% ethanol by weight, the process comprising:

charging the ethanol-water mixture to an inlet end of a bed of adsorbent material having a greater affinity for ethanol than for water,

passing the mixture through the bed, and withdrawing an effluent from an outlet end of the bed, the effluent consisting essentially of the mixture decreased in content of the ethanol and water adsorbed by the bed,

after the adsorbent material is substantially saturated, desorbing the ethanol and water from the adsorbent material in at least two steps at substantially the same pressure but at different temperatures, one of the steps being carried out at a temperature of about 45° C. to about 95° C. and a subsequent desorption step being carried out at a greater temperature than that of the first step and a temperature of about 75° C. to about 150° C., and

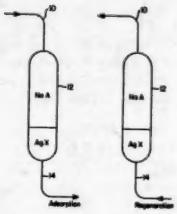
separately recovering the material desorbed in the two steps, the concentration of water being greater in the material recovered from the first desorption step than in the material recovered from the subsequent desorption step and the concentration of ethanol being greater in the material recovered from the subsequent desorption step than in the material recovered from the first desorption step.

4,874,525

PURIFICATION OF FLUID STREAMS CONTAINING MERCURY

John Markovs, Yorktown Heights, N.Y., assignor to UOP, Des Plaines, Ill.

Filed Oct. 26, 1988, Ser. No. 262,830
Int. Cl.[4] B01D *15/00, 53/04*
U.S. Cl. 210—673 10 Claims



1. Process for the removal of mercury vapor from a fluid stream which comprises passing said stream through an adsorbent bed containing particles comprised of crystallites of a zeolitic molecular sieve having pore diameters of at least 3.0 Angstroms and in which the said zeolite crystallites forming the outer shell of the adsorbent particles to a depth of not greater than about 0.1 millimeter into the particles and constituting less than about 35 volume percent of said particles, contain ionic or elemental silver, the remainder of the overall adsorbent particles being essentially free of silver, whereby at least a major proportion of said mercury is adsorbed and a purified effluent fluid stream is recovered.

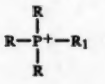
4,874,526

TREATMENT OF WATER

Reinhardt Grade, Bensheim, Fed. Rep. of Germany, and Brien M. Thomas, Stockport, England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

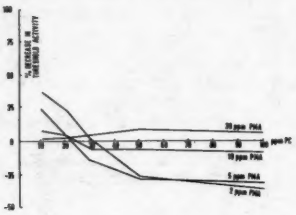
Continuation-in-part of Ser. No. 122,555, Nov. 12, 1987, abandoned, which is a continuation of Ser. No. 992,826, Oct. 22, 1986, abandoned, which is a continuation of Ser. No. 559,840, Dec. 9, 1983, abandoned, which is a continuation of Ser. No. 382,062, May 26, 1982, abandoned. This application May 26, 1988, Ser. No. 199,224
Claims priority, application United Kingdom, May 30, 1981, 8116589
Int. Cl.[4] C02F *5/14*
U.S. Cl. 210—697 7 Claims

1. A process for treating water to destroy biological growth and prevent fouling of heat exchange surfaces which treatment comprises adding to the water (a) from 1 to 50 ppm of a phosphonium compound of the formula:



in which R represents C_1–C_6 alkyl groups which are unsubstituted or substituted by a cyano, hydroxy, esterified hydroxy or aryl group, R_1 represents a C_8–C_{18} alkyl group and X represents chlorine or bromine, and (b) from 0.1 to 100 ppm of an anionic scale or corrosion inhibiting agent selected from the

group consisting of polyacrylates, polymethacrylates, polyphosphates, phosphonates, aminophosphonates, polymeric



carboxylic acids, co-or ter-polymers of carboxylic acids and one or more other monomers, nitrites, molybdates, silicates, phosphino or phosphono carboxylic acids, and phosphates.

4,874,527

METHOD FOR CONTROLLING SILICA/SILICATE DEPOSITION IN AQUEOUS SYSTEMS USING IMINES

Jasbir S. Gill, Corsopolis, Pa., assignor to Calgon Corporation, Pittsburgh, Pa.

Filed Apr. 28, 1988, Ser. No. 187,172
Int. Cl.[4] C02F *5/14*
U.S. Cl. 210—700 **2 Claims**

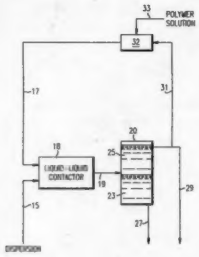
1. A method for controlling silica/silicate deposition including calcium and magnesium silicates in an aqueous system having a pH of less than about 9 comprising adding to said system an effective amount of a composition comprising: (a) a water soluble polyethylene imine having a molecular weight of less than about 20,000; (b) diethylene triamine penta(methylene phosphonic acid); and (c) a molybdate ion source; wherein the weight ratio of (a):(b), on an active basis, ranges from about 4:1 to about 1:4 and wherein the weight ratio of (a):(c), on an active basis, ranges from about 4:1 to about 1:4.

4,874,528

METHOD FOR TREATING DISPERSIONS OF OLEOPHILIC LIQUIDS AND WATER

Michael R. Foreman, Maurice, La.; Albert F. Hadermann, Ijamsville, Md., and Jerry C. Trippe, Fairfax Station, Va., assignors to General Technology Applications, Inc., Manassas, Va.

Filed Jul. 18, 1988, Ser. No. 220,628
Int. Cl.[4] B01D *17/04*
U.S. Cl. 210—705 **20 Claims**



1. A method for treating a dispersion of an oleophilic liquid in water to obtain separation of the oleophilic liquid from the water phase comprising:

forming a solution of a polymer in a solvent, said polymer being soluble in said oleophilic liquid and having a molecular weight sufficient to impart viscoelastic properties to said solution, said solvent being miscible with said oleophilic liquid;

contacting said dispersion with said polymer solution to dissolve polymer molecules in the oleophilic droplets of said dispersion thereby rendering said droplets viscoelastic and promoting their agglomeration with said solution; and

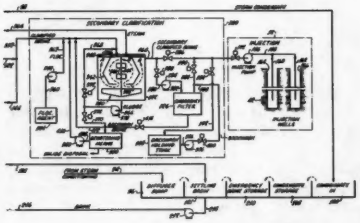
separating said polymer solution, now containing oleophilic liquid, from the water phase.

4,874,529

PROCESS AND APPARATUS FOR REDUCING THE CONCENTRATION OF SUSPENDED SOLIDS IN CLARIFIED GEOTHERMAL BRINE

John L. Featherstone; S. Timothy Spang, both of El Centro; David G. Newell, Palm Desert, and Darrell L. Gallup, Chino, all of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Continuation-in-part of Ser. No. 814,099, Dec. 27, 1985, Pat. No. 4,728,438. This application Feb. 29, 1988, Ser. No. 162,005
The portion of the term of this patent subsequent to Mar. 1, 2005, has been disclaimed.
Int. Cl.[4] C02F *1/56*
U.S. Cl. 210—713 **29 Claims**



1. A process for reducing the concentration of residual solids suspended in geothermal brine overflow from a primary brine clarification stage in which a mixture of hot, flashed, silica-rich geothermal brine and suspended siliceous material is separated so as to provide a siliceous sludge and said geothermal brine overflow having a residual amount of solids still remaining suspended therein, and ferrous ions, the process comprising:

(a) flowing the geothermal brine overflow, comprising at most about 300 PPM solids by weight, from said primary brine clarification stage into a secondary clarifier vessel;

(b) blanketing the geothermal brine overflow from the primary brine clarification stage with steam in order to prevent oxidation of ferrous ions in the geothermal brine;

(c) contacting said geothermal brine overflow from the primary brine clarification stage in the secondary clarifier vessel with a flocculating agent so as to cause at least some of the solids suspended in the brine to flocculate;

(d) discharging from the secondary clarifier vessel an underflow of flocculated solids and brine and an overflow;

(e) recirculating at least a portion of said flocculated solids so as to provide a preestablished solids concentration in reaction and flocculating regions of the secondary clarifier vessel in which the flocculating agent and brine are contacted;

(f) discharging from the secondary clarifier vessel a secondarily clarified brine overflow in which the concentration of residual suspended solids is substantially reduced over the concentration of residual solids suspended in the brine overflow from the primary clarification stage: and

(g) preventing circulation of the secondary clarifier vessel overflow and the secondary clarifier vessel underflow to the primary brine clarification stage.

4,874,530

METHOD FOR TREATING PHOTOGRAPHIC PROCESSING WASTE SOLUTION

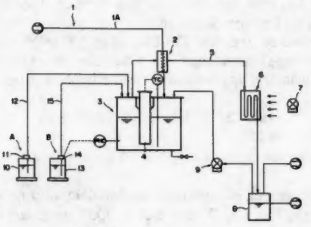
Kazuhiro Kobayashi; Masayuki Kurematsu; Shigeharu Koboshi; Nobutaka Goto, and Naoki Takabayashi, all of Hino, Japan, assignors to KNICA Corporation, Tokyo, Japan

Filed Nov. 27, 1987, Ser. No. 126,408

Claims priority, application Japan, Dec. 5, 1986, 61-291137; Dec. 8, 1986, 61-291944; Dec. 10, 1986, 61-293798; Dec. 10, 1986, 61-293799; Dec. 10, 1986, 61-293800

Int. Cl.[4] C02F *1/62*

U.S. Cl. 210—718 21 Claims



1. A method for treating a photographic processing waste solution containing at least thiosulfate ions, comprising heating the photographic processing waste solution to evaporate the solvent and concentrate the solute in the remaining solution, and further comprising

(i) introducing sulfite ions or a compound capable of releasing sulfite ions into the photographic processing waste solution at the time or before heating of the photographic processing waste solution.

4,874,531

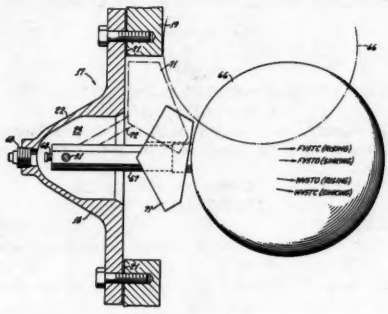
APPARATUS AND METHOD FOR SEPARATING WATER FROM AVIATION FUEL, AND FLOAT CONTROL THEREFOR

Harold W. Ensign, Fullerton, Calif., assignor to Cla-Val Co., Costa Mesa, Calif.

Continuation of Ser. No. 36,401, Apr. 9, 1987, abandoned. This application Feb. 15, 1989, Ser. No. 312,344

Int. Cl.[4] B01D *17/12*

U.S. Cl. 210—744 21 Claims



16. A method of separating water from aviation fuel, which comprises:

(a) delivering highly-pressurized aviation fuel to a filter separator tank,

(b) providing a float element in the bottom of said tank,

(c) causing said float element to be sufficiently buoyant that it will float in said fuel,

(d) associating said float element with a weight that is sufficiently heavy to cause said float element to float at an interface between said fuel and water that is separated from said fuel by said filter separator tank and therefore collects at the bottom of said tank,

(e) associating said float element with valve means that shut off the flow of fuel out of said tank when said interface rises to a predetermined level, and that drain water from said tank when said float element rises to a predetermined level,

(f) periodically discontinuing the association between said float element and said weight,

(g) determining whether or not said float element rises in response to said discontinuing, and

(h) employing the presence or absence of said rising as the criterion determining whether or not said float element has waterlogged.

4,874,532

METHOD FOR DECONTAMINATION OF TOXIC CHEMICAL AGENTS

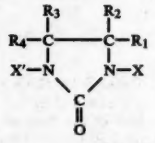
Shelby D. Worley, Auburn, Ala., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jun. 29, 1988, Ser. No. 212,822

Int. Cl.[4] C02F *1/58*

U.S. Cl. 210—755 11 Claims

1. A method for decontaminating a toxic chemical agent susceptible to oxidation by halogen, which comprises contacting said chemical agent with a decontaminating amount of N,N'-dihalo-2-imidazolidinone represented by the graphic formula,



wherein X and X' are each halogen selected from the group consisting of chlorine and bromine, provided that at least one of X and X' is chlorine, R_1, R_2, R_3 and R_4 are each selected from the group consisting of hydrogen, C_1–C_4 alkyl, C_1–C_4 alkoxy, hydroxy and substituted phenyl, provided that not more than one of the R_1–R_4 is hydrogen, said phenyl substituents each being selected from the group consisting of C_1–C_4 alkyl, C_1–C_4 alkoxy and hydroxy.

4,874,533

APPARATUS AND PROCESS FOR FILTERING FLUIDS

Ronald A. Boze, 19 Wisteria La., Covington, La. 70433, and Theodore A. Warning, 11227 Rippling Meadow, Houston, Tex. 77064

Continuation-in-part of Ser. No. 843,996, Mar. 25, 1986, Pat. No. 4,704,210. This application Sep. 14, 1987, Ser. No. 96,634

Int. Cl.[4] B01D *37/02*

U.S. Cl. 210—778 2 Claims

1. A process of filtering a fluid having suspended contaminants, comprising the steps of:

providing a filtration vessel having at least one filter element mounted therein, the filter element having an interior and an exterior, wherein the filter element comprises a hollow conduit having an interior and an exterior surface, with the conduit being formed by a wedge wire wound in a helical fashion with coils being secured in a helical relationship by axial braces securedly attached to the wire on the interior of conduit;

providing means for delivering the fluid to be filtered into the filtration vessel;

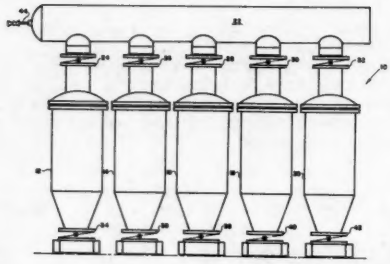
introducing a flow of the contaminated fluid into the filtration vessel;

forming a layer of filter media on the exterior of the filter element;

removing filtrate from the interior of the filter element and delivering it outside of the filtration vessel;

detecting a pressure differential of a predetermined valve across the filter element;

interrupting a flow of contaminated fluid into the filtration vessel;



providing a backflushing reservoir containing a pressurized backflushing fluid;

backflushing the filter element by a fluid pressurized to a level at least slightly above the level of pressure differential across the filter element at a velocity sufficient to create a backflushing shock capable of dislodging the contaminants which formed a layer on the exterior on the filter element; and removing the dislodged contaminants from the filtration vessel.

4,874,534

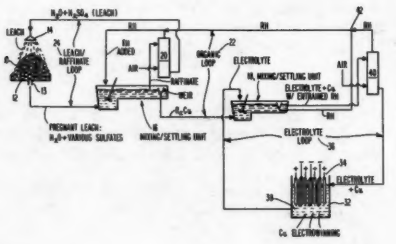
METHOD FOR REMOVAL OF ORGANIC SOLVENTS FROM AQUEOUS PROCESS STREAMS

James L. Sorensen; Mark D. Yarbro, both of San Manuel, and Charles A. Glockner, Tucson, all of Ariz., assignors to Magma Copper Company, San Manuel, Ariz.

Filed Jan. 11, 1988, Ser. No. 141,736

Int. Cl.[4] B01D *21/00*

U.S. Cl. 210—803 **16 Claims**



1. A method of removal of entrained droplets of an organic solvent immiscible in water from an aqueous process stream compriaing the steps of:

introducing the process stream containing the entrained organic solvent droplets, said solvent being present in said stream in a concentration of no more than about 500 ppm, at an upper location in a vertically extending vessel,

introducing air in a manner such that bubbles are formed at a lower location in the vessel,

permitting said bubbles to rise upwardly through said aqueous process stream, whereupon said droplets of organic solvent are effectively bound to said bubbles and a froth thereof accumulates on the upper surface of said aqueous solution in said vessel,

withdrawing the aqueous process stream having had the organics removed therefrom from an outlet in the vessel beneath the point of introduction of the air thereto, and

removing the froth from the top of the vessel.

4,874,535

SCALE INHIBITORS

Ian C. Callaghan, Wokingham, and Ian Livsey, Twickenham, both of England, assignors to The Britisch Petroleum Company p.l.c., London, England

Continuation of Ser. No. 839,144, Mar. 12, 1986, abandoned. This application Apr. 28, 1988, Ser. No. 188,689

Claims priority, application United Kingdom, Mar. 14, 1985, 8506616

Int. Cl.[4] E21B *43/28*; C02F *5/14*

U.S. Cl. 252—8.552 **7 Claims**

1. A scale inhibiting composition comprising the combination of

(a) a copolymer of isobutene and maleic acid or anhydride wherein the copolymer has 3–3000 units derived from isobutene and 3–3000 units derived from maleic acid or anhydride, said copolymer being in its acid or alkali metal or ammonium form,

(b) a 1-hydroxyethyl 1,1diphosphonic acid or salt form selected from the group consisting of alkali metal, ammonium, amine and alkanolamine salt form; said components (a) and (b) being present in a weight ratio in the range of 10:1 to 1:10.

4,874,536

SYNTHETIC SURFACTANT CAKES WITH MAGNESIUM CHLORIDE

Wilbur C. Strickland, Jr., Cincinnati, and Roostain F. Sterling, Milford, both of Ohio, assignors to The Proctor & Gamble Company, Cincinnati, Ohio

Filed Jun. 29, 1984, Ser. No. 625,984

Int. Cl.[4] C11D *1/12, 1/755*

U.S. Cl. 252—90 **12 Claims**

1. A solid water-soluble toilet bowl cleaning cake consisting essentially of from 20% to 90% C_9-C_{15} alkyl sulfate C_9-C_{15} alkyl benzene sulfonate co-surfactant having a 1:1.5 to 1.5:1 ratio and from 0.5% to 25% weight magnesium chloride wherein said cake is present in a dosing toilet bowl dispenser.

4,874,537

STABLE LIQUID NONAQUEOUS DETERGENT COMPOSITIONS

David Peterson; Loren Chen, both of Pleasanton, and Robert J. Iliff, Oakley, all of Calif., assignors to The Clorox Company, Oakland, Calif.

Filed Sep. 28, 1988, Ser. No. 251,719

Int. Cl.[4] C11D *3/075, 3/39*

U.S. Cl. 252—99 **15 Claims**

1. A stable liquid, nonaqueous, detergent composition comprising, by weight percent:

(a) 20–90% of a liquid portion which comprises an alkosylated nonionic surfactant;

(b) a solids portion which comprises:

(i) 5–50% of a builder;

(ii) 0–20% of an oxidant; said solids being stably suspended in said liquid portion, by means of

(c) 0.5–20% of a sulfonated, lower alkylated condensed ring aryl compound; and

(d) 0–5% of a hydrolytic enzyme.

4,874,538

TOILET SOAP BAR COMPOSITIONS CONTAINING WATER SOLUBLE POLYMERS

Geoffrey G. Dawson, Ponteland, and Michael K. Williams, Wokingham, both of England, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Oct. 23, 1986, Ser. No. 922,366

Claims priority, application United Kingdom, Oct. 29, 1985, 8526647; Mar. 13, 1986, 8606239

Int. Cl.[4] C11D *9/26, 9/30, 17/00*

U.S. Cl. 252—117 10 Claims

1. A beta-phase milled transparent or translucent toilet bar composition comprising:

(a) from about 45% to about 95% by weight of soluble alkali metal soap of C_8–C_{24} fatty acids,

(b) from about 0% to about 45% of synthetic surfactant selected from the group consisting of anionic surfactant, amphoteric surfactant, and mixtures thereof, and

(c) from about 0.01% to about 5% of water-soluble polymer having a molecular weight of from about 20,000 to about 5,000,000 selected from the group consisting of

(1) cationic polymer selected from the group consisting of cationic guar gums, quaternized cellulose ethers, quaternized vinylpyrrolidone acrylate or methacrylate copolymers of aminoalcohol, copolymers of dimethyldiallyl ammonium chloride and acrylamide, homopolymers of dimethyldiallyl ammonium chloride, and mixtures thereof;

(2) nonionic polymers selected from the group consisting of guar gum and hydroxypropyl guar gum having a degree of substitution of from about 0.3 to about 1.2; and

(3) mixtures thereof;

wherin at least about 50% by weight of the soap is in the beta-phase.

4,874,539

CARBOXY HYDROXAMIC ACID POLYMERS AND THEIR USE AS DETERGENT ADDITIVES

K. Robert Huffman, Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Aug. 6, 1987, Ser. No. 82,263

Int. Cl.[4] C11D *3/20, 3/37*

U.S. Cl. 252—174.24 9 Claims

4. A process for preparing polymeric carboxyl hydroxamic acids comprising

(a) reacting polyacrylic acid with a compound of the formula R' represents an organic radical of 1 to 12 carbon atoms selected from the group consisting of straight for branched claim alkyl, aryl, alkaryl, aralkyl or alkenyl radicals and X represents a halogen atom or an organic anhydride residue having the formula $R'C{:}OO^-$, wherein R' is as defined above, wherein said reaction being conducted in the absence of a catalyst and

(b) reacting the resultant polymeric anhydride with a hydroxylamine compound of the formula HRNOH, wherein R represents hydrogen or C–C_6 alkyl, cycloalkyl, or phenyl group.

9. A detergent composition with transition metal ion chelating activity comprising one or more detersive surfactants, and about 3% to about 12% by weight of the total composition of a polmer having randomly alternating repeating units consisting essentially of those the formulae wherein R represents hydrogen or C_1–C_6 alkyl, cycloalkyl or a phenyl group.

4,874,540

GRAFT COPOLYMERS OF A POLYETHER MOIETY ON A POLYCARBOXYLATE BACKBONE

Richard B. Greenwald, Eagan; Chung-Tsing Liu, Bloomington, and James A. McDonell, St. Paul, all of Minn., assignors to Ecolab Inc., St. Paul, Minn.

Continuation-in-part of Ser. No. 887,891, Jul. 18, 1986, abandoned. This application Sep. 3, 1987, Ser. No. 92,686

Int. Cl.[4] C11D *3/37*

U.S. Cl. 252—174.24 31 Claims

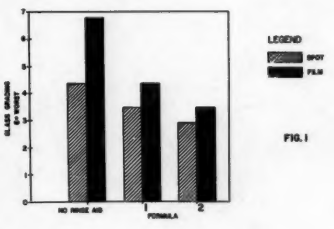


FIG. 1

1. A polymeric, water treating composition comprising a graft block copolymer with a chelation value above about 1875, the graft block copolymer having 10 to 50 wt-% of a backbone polymer having repeating units derived from an alpha, beta unsaturated carboxylic acid monomer, the carboxylic acid selected from the group consisting of acrylic acid, methacrylic acid, itaconic acid, or mixtures thereof, and grafted thereon 50 to 90 wt-% of polymeric moieties having repeating units derived from an alkylene oxide, said grafted moieties terminating in a hydroxyl group the polymer having been prepared by reacting the components at a temperature of about ambient to about 100° C.

4,874,541

ALL-IN-ONE BOILER WATER TREATMENT COMPOSITION

Lyle H. Steimel, Forest Park, and Ronald J. Christensen, Montgomery, both of Ohio, assignors to DuBois Chemicals, Inc., Cincinnati, Ohio

Continuation of Ser. No. 133,504, Dec. 16, 1987, abandoned. This application Jun. 10, 1988, Ser. No. 204,861

Int. Cl.[4] C02F *5/12*

U.S. Cl. 252—178 6 Claims

1. A concentrated all-in-one boiler water treatment composition consisting of

Glucoheptonate: 0% to 0.2%
Sulfite: 0.1% to 14%
Polyhydroxy acid: 0.1 to 5%
Diethylaminoethanol: 0.0 to 15.0%
1st polymer: 0.1 to 4%
Polymaleate: 0.01 to 4%
Carbonate: 0 to 7%
Water soluble base: 0 to 20%
Water: to 100%

wherein said sulfite is selected from the group consisting of sodium sulfite and potassium sulfite;

wherein said 1st polymer is selected from the group consisting of;

wherein said carbonate is selected from the group consisting of sodium carbonate and potassium carbonate;

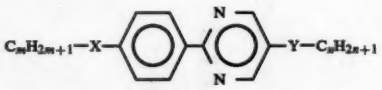
wherein said polyhydroxy acid is selected from the group consisting of ascorbic acid and erythorbic acid.

4,874,542
PHENYL-PYRIMIDINE LIQUID CRYSTAL COMPOUNDS AND LIQUID CRYSTAL COMPOSITIONS CONTAINING THE SAME

Ryoichi Higuchi; Takao Sakurai; Tadahiko Yokota; Naoko Mikami; Eri Yamamoto, and Koji Takeuchi, all of Kawasaki, Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Mar. 31, 1988, Ser. No. 176,154
Claims priority, application Japan, Mar. 31, 1987, 62-78289; Oct. 29, 1987, 62-274389
Int. Cl.[4] G02F *1/13*; C09K *19/34*; C07D *239/02*
U.S. Cl. 252—299.61 15 Claims

1. A compound of the formula:



wherein either X is —O—, Y is —OCOO—, m is 7–10 and n is 5–12; or X is —OCOO—, Y is a direct bond, m is 5–12 and n is 7–12.

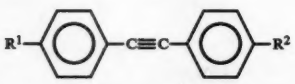
4,874,543
LIQUID CRYSTAL COMPOSITION

Tetsushi Yoshida, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Nov. 12, 1987, Ser. No. 120,091
Claims priority, application Japan, Nov. 14, 1986, 61-270928
Int. Cl.[4] C09K *19/06, 19/4, 19/30, 19/34*
U.S. Cl. 252—299.61 27 Claims

1. A liquid crystal composition having positive dielectric anisotropy, comprising:

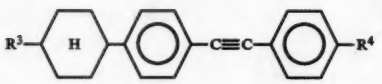
30 to 60 wt % based on the total weight of said liquid crystal composition of a first liquid crystal material comprising at least one liquid crystal compound represented by formula (I):



(I)

wherein R^1 represents a straight-chain alkyl group having 2 to 5 carbon atoms, and R^2 represents a straight-chain alkyl or alkoxy group having 1 to 5 carbon atoms;

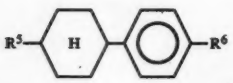
1 to 20 wt % of a second liquid crystal material comprising at least one liquid crystal compound represented by formula (II):



(II)

wherein R^3 represents a straight-chain alkyl group having 2 to 4 carbon atoms and R^4 represents a straight chain alkyl group having 1 to 4 carbon atoms;

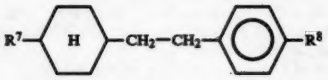
10 to 30 wt % of a third liquid crystal material containing a liquid crystal compound represented by formula (III) and optionally a liquid crystal compound represented by formula (IV):



(III)

and

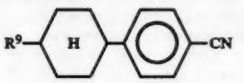
-continued



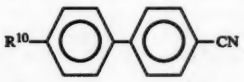
(IV)

wherein each of R^5 and R^7 independently represents a straight-chain alkyl group having 2 to 5 carbon atoms, R^6 represents a straight-chain alkyl or alkoxy group having 2 to 5 carbon atoms, or —O—CH_2—CH=CH—CH_3, and R^8 represents an alkoxy group having 2 to 4 carbon atoms; and

5 to 50 wt % of a fourth liquid crystal material containing at least one selected from liquid crystal compounds represented by formulas (V) to (VII):

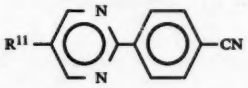


(V)



(VI)

and



(VII)

wherein each of R^9 and R^{10} independently represents a straight-chain alkyl group having 2 to 5 carbon atoms, and R^{11} represents a straight-chain alkyl group having 4 to 7 carbon atoms,

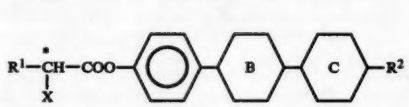
said liquid crystal composition, as a whole, having optical anisotropy of at least 0.18.

4,874,544
FERROELECTRIC LIQUID CRYSTALS

Bak G. Yong; Barth Petra; Demus Dietrich; Joachimi Detlev, all of Halle; Barbara Kampa, Halle-Neustadt; Saskia Köhler, Halle-Neustadt; Kristine Mohr, Halle-Neustadt; Reinhard Paschke, Halle-Neustadt; Gerhard Peizl, Halle-Neustadt; Ulrich Rosenfeld, Halle; Wolfgang Schäfer, Potsdam; Klaus-Dieter Scherf, Halle; Carsten Tschirske, Halle; Wolfgang Weissflog, Halle-Neustadt, and Horst Zaschke, Halle, all of German Democratic Rep., assignors to VEB Werk fuer Fernsehelektronik im VEB Kombinat Mikroelektronik, Berlin, German Democratic Rep.

Filed Feb. 3, 1988, Ser. No. 151,731
Claims priority, application German Democratic Rep., Feb. 19, 1987, 300041
Int. Cl.[4] G02F *19/34*; C07D *239/02, 285/12*
U.S. Cl. 252—299.61 18 Claims

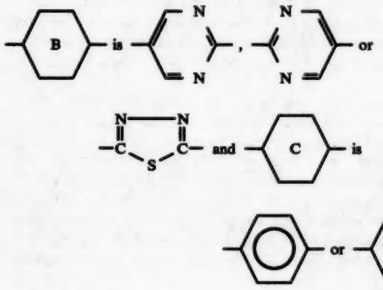
1. A chiral halogenated alkyl group containing ferroelectric liquid crystal compound of the formula



wherein

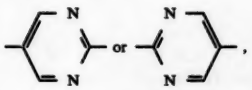
R^1 is C_lH_{2l+1}—, $(CH_3)_2CH$—, $(CH_3)_2CH$—CH_2—, or C_2H_5—$CH(CH_3)$—, in which l=3–12,

R^2 is C_kH_{2k+1}— or $C_kH_{2k+1}O$—, in which k=1–12,
X is Cl or F,



with the proviso that if

is



R^1 is only C_2H_5—$CH(CH_3)$—.

4,874,545

CHIRAL ESTERS OF α-SUBSTITUTED PHENYLALKANOIC ACIDS AND MESOGENIC HYDROXY COMPOUNDS, AND THEIR USE AS A DOPING SUBSTANCE IN LIQUID CRYSTAL PHASES

Gerd Heppke; Günter Scherowsky; Christian Bahr, and Lutz Lehmann, all of Berlin, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

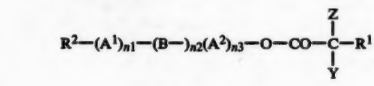
Filed Jun. 12, 1987, Ser. No. 62,062

Claims priority, application Fed. Rep. of Germany, Jun. 14, 1986, 3620049

Int. Cl.[4] C09K *19/34, 19/30, 19/20, 19/12*

U.S. Cl. 252—299.61 **3 Claims**

1. An optically active ester of the formula (I)



wherein

R^2 is a straight-chain (C_4–C_{10})-alkyl, where one CH_2 group may be replaced by an O or S atom;

A^1 and A^2, independently of one another, are 1,4-phenylene, 1,4-cyclohexylene or pyrimidine-2,5-diyl;

B is CO—O or O—CO;

n1 is 1;

n2 is 0 or 1;

n3 is 1 or 2;

Y is CF_3;

Z is OCH_3; and

R^1 is phenyl.

4,874,546

PHENYLPYRIMIDINECARBOXYLATE DERIVATIVE

Naoyuki Yoshida, Kamakura; Kisei Kitano, and Tetsuya Ogawa, both of Yokohama, all of Japan, assignors to Chisso Corporation, Japan

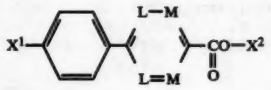
Continuation-in-part of Ser. No. 863,505, May 15, 1986, abandoned. This application Jul. 20, 1987, Ser. No. 75,657

Claims priority, application Japan, May 15, 1985, 60-103512; May 21, 1985, 60-108504

Int. Cl.[4] G02F *1/13;* **C09K** *19/34;* **C07D** *239/02*

U.S. Cl. 252—299.61 **12 Claims**

1. A phenylpyrimidinecarboxylate derivative expressed by the general formula



wherein X^1 represents an alkyl group or an alkoxy group each of 1 to 10 carbon atoms; X^2 represents a 4-substituted phenyl group having as a substituent an alkyl group of 1 to 10 carbon atoms and L represents =N— and M represents —C=.

4,874,547

BI-MODAL SILICONE EMULSIONS, SILICONE EMULSIFICATION PROCESS AND EMULSIONS THEREFROM

Dipak Narula, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Apr. 2, 1985, Ser. No. 718,985

Int. Cl.[4] B01J *13/00;* **C09K** *3/00*

U.S. Cl. 252—312 **20 Claims**

1. An emulsification process comprising

(I) intimately mixing components consisting essentially of

(A) 100 parts by weight of a polydimethylsiloxane fluid having a viscosity of up to 50 pascal-seconds at 25° and consisting essentially of from 1 to 100 parts by weight of (i) a nonvolatile polydimethylsiloxane portion having a viscosity of at least 30 pascal-seconds at 25° C. and from 0 to 99 parts by weight of (ii) a volatile polydimethylsiloxane portion and (B) from 1 to 5 millimols, per millimol of primary surfactant, of a nonionic secondary surfactant having an HLB number of from 7 to 9.

(II) intimately mixing with the mixture of (I) components consisting essentially of (C) at least 3 millimols of a nonionic primary surfactant having an HLB number of from 13 to 15 and (D) an emulsion-forming amount of water to form a rough silicone-in-water emulsion, and

(III) subjecting the rough emulsion to the comminuting action of a low shear generating means for a period of time sufficient to reduce the average particle size of the silicone to a value less than about 2 micrometers; the temperature of the emulsion being maintained at a value of from about 1° to 40° C. during said subjecting.

13. A bi-modal silicone-in-water emulsion composition consisting essentially of

(A) 100 parts by weight of bi-modal polydimethylsiloxane fluid component having a viscosity of up to 50 pascal-seconds at 25° C. and consisting essentially of

(i) 1 to 75 parts by weight of a nonvolatile polydimethylsiloxane portion having a viscosity at 25° C. of at least 30 pascal-seconds and

(ii) 25 to 99 parts by weight of a volatile polydimethylsiloxane portion,

(B) from 1 to 5 millimols, per millimol of primary surfactant, of a nonionic secondary surfactant having an HLB number of from 7 to 9,

(C) at least 3 millimols of a nonionic primary surfactant having an HLB number of from 13 to 15, and

(D) an emulsion-forming amount of water.

4,874,548

CONDUCTIVE ADHESIVE

Robert J. Hajovsky, Scotland, Tex., assignor to Ameron, Inc., Monterey Park, Calif.

Filed Mar. 14, 1988, Ser. No. 167,368
Int. Cl.[4] H01B 1/06
U.S. Cl. 252—511 20 Claims

1. An electrically conductive adhesive composition comprising a curable thermosetting resin and conductive fibers in a concentration of from about 0.7 to less than about five percent by weight of the composition, the conductive fibers each having a length of from about 4 to about 8 millimeters.

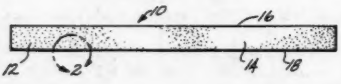
9. An electrically conductive adhesive composition comprising a curable epoxy resin and stainless steel fibers, said stainless steel fibers having a length of from about 4 mm to about 8 mm and being present in a concentration of from about 0.7 to not more than about 5% by weight of the composition.

4,874,549

PRESSURE SENSITIVE ELECTRO-CONDUCTIVE MATERIALS

Michael Michalchik, Los Altos, Calif., assignor to Advanced Micro-Matrix, Inc., Altadena, Calif.

Division of Ser. No. 809,075, Dec. 13, 1985, Pat. No. 4,745,301. This application Apr. 26, 1988, Ser. No. 186,186
Int. Cl.[4] H01B 1/06
U.S. Cl. 252—511 12 Claims



1. A process for the preparation of a pressure sensitive electro-conductive material comprising the steps of:

a. Preparing a solvent system comprising water, a water miscible carbon-wetting organic solvent, and a surfactant;

b. Mixing finely divided electro-conductive carbon particles into the solvent system to form a uniform slurry;

c. Maintaining the slurry for a predetermined period of time to obtain substantial wetting of the carbon particles of the solvent system to form a pre-agglomeration composition;

d. Dispersing the pre-agglomeration composition into an aqueous elastomeric composition to form an elastomeric-carbon composition containing electrically conductive micro-agglomerates comprising unbound finely divided electro-conductive carbon particles enclosed by a matrix of elastomeric material and bound finely divided electro-conductive carbon particles; and

e. Drying said elastomeric-carbon composition to obtain the pressure-sensitive electroconductive material.

4,874,550

THICK-FILM COPPER CONDUCTOR INKS

Ashok N. Prabhu, East Windsor; Kenneth W. Hang, and Edward J. Conlon, both of Princeton, all of N.J., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 87,583, Aug. 20, 1987, Pat. No. 4,808,770, which is a continuation-in-part of Ser. No. 914,303, Oct. 2, 1986, abandoned. This application Dec. 2, 1988, Ser. No. 278,987
Int. Cl.[4] H01B 1/06
U.S. Cl. 252—512 7 Claims

1. A copper conductor ink comprising, on a weight basis:

(a) from about 65 to about 85 percent of copper powder;

(b) from about 5 to about 15 percent of a devitrifying glass frit selected from the group consisting of a zinc-calcium-aluminum-silicate glass frit, a zinc-magnesium-barium-aluminum-silicate glass frit and mixtures thereof, which does not begin to flow until the furnace temperature is above about 700° C., the zinc-calcium-aluminum-silicate glass frit comprising, on a weight basis:

(i) from about 7 to about 12 percent of zinc oxide;

(ii) from about 25 to about 45 percent of calcium oxide;

(iii) from about 10 to about 20 percent of aluminum oxide;

(iv) from about 35 to about 50 percent of silicon dioxide;

(v) from 0 to about 2 percent of phosphorus pentoxide; and

(vi) from 0 to about 5 percent of zirconium silicate; and the zinc-magnesium-barium-aluminum-silicate glass frit comprising, on a weight basis;

(i) from about 15 to about 25 percent of zinc oxide;

(ii) from about 10 to about 25 percent of magnesium oxide;

(iii) from about 3 to about 12 percent of barium oxide;

(iv) from about 5 to about 20 percent of aluminum oxide;

(v) from about 35 to about 50 percent of silicon dioxide;

(vi) from 0 to about 5 percent of phosphorus pentoxide; and

(vii) from 0 to about 5 percent of zirconium silicate; and

(c) from about 5 to about 25 percent of a solution of at least one resin as binder.

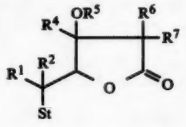
4,874,551

δ-LACTONE DERIVATIVES AND PROCESS OF PREPARING SAME

Tetsuji Kametani, Tokyo, and Toshio Honda, Yokohama, both of Japan, assignors to Itaro Horiuchi & Co., Ltd, Tokyo, Japan

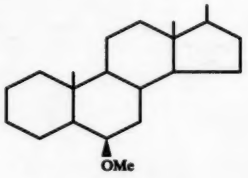
Filed Apr. 6, 1987, Ser. No. 34,734
Claims priority, application Japan, Apr. 18, 1986, 61-88278
Int. Cl.[4] C07J 19/00, 21/00, 53/00, 63/00
U.S. Cl. 260—397.1 15 Claims

1. Gamma-lactone derivatives represented by the formula (I)



wherein when R^1 is methyl group, R^2 is hydrogen, hydroxyl group or trifluoroacetoxyl group and R^3 is hydrogen, or R^2 may combine with R^3 to form π bond; when R^1 combines with R^2 to form methylene group, R^3 is hydrogen; R^4 and R^6 hydrogen, respectively, or may combine to form π bond; R^5 is hydrogen or a protecting group for hydroxyl group; R^7 is hydrogen or straight-chain or branched alkyl group; and St is a steroid nucleus represented by the following formula (A):

(A)



4,874,552

PROCESS FOR SIMULTANEOUS BLEACHING AND NEUTRALIZATION OF ALPHA-SULFOFATTY ACID ESTERS

Hans-Joachim Richtler, Moenchengladbach; Udo Kreutzer, Monheim; Franz-Josef Carduck, Haan; Klaus Koester, Langenfeld, and Hubert Harth, Duesseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jun. 15, 1987, Ser. No. 62,736

Claims priority, application Fed. Rep. of Germany, Jun. 14, 1986, 3620158

Int. Cl.[4] C07C *143/12*

U.S. Cl. 260—400 17 Claims

1. A process for the production of solid, substantially anhydrous alkali metal salts of α-sulfofatty acid alkyl esters by oxidative bleaching and neutralization of α-sulfofatty acid alkyl esters containing from 8 to 22 carbon atoms in the fatty acid chain and from 1 to 6 carbon atoms in the ester alkyl radical, comprising the steps of

(a) simultaneously mixing together solid or molten α-sulfofatty acid alkyl esters, an aqueous solution of hydrogen peroxide or an H_2O_2- yielding compound, and solid alkali metal carbonate at a temperature of from about 20 to about 80° C., wherein the ratio by weight of ester to H_2O_2 is from about 1:0.01 to about 1:0.06 and the molar ratio of ester to alkali metal carbonate is in the range of from about 1:0.5 to about 1:0.75,

(b) destroying the foam formed through the release of CO_2 under a pressure of from about 0.2 to about 1.0 bar, and at a temperature of from about 50° to about 70° C., and

(c) degassing and dehydrating the product formed under a pressure of from about 15 to about 100 mbar and at a temperature of from about 50° to about 80° C.

4,874,553

AQUEOUS PHOSPHOLIPID SOLUTIONS CONTAINING A SOLUBILIZING AGENT

Hager, Jörg; Miklos Ghyczy, both of Cologne; Vincent Feyen, Bergheim; Paul Imberge, Pulheim-Sinthern; Ulrich Brandenburg, Cologne, and Peter Wilperath, Bergisch Gladbach, all of Fed. Rep. of Germany, assignors to A. Nattermann & Cie. GmbH, Cologne, Fed. Rep. of Germany

Filed Mar. 11, 1987, Ser. No. 24,565

Claims priority, application Fed. Rep. of Germany, Mar. 14, 1986, 3608455

Int. Cl.[4] C07E *9/10*

U.S. Cl. 260—403 12 Claims

1. An aqueous phospholipid solution comprising as a solubilizing agent at least one of (1) one or more compounds of the formula I

$$RO—A—NR_1R_2$$

in which R denotes hydrogen or an acyl radical of a carboxylic acid having 1–22 carbon atoms, A denotes a straight-chain or branched alkylene group having 1–10 carbon atoms and R_1 and R_2, which are identical or different denote hydrogen or an alkyl group having 1–8 carbon atoms, or (2) one or more salts of an inorganic or an organic acid and

$(RO—A—N^+R_1R_2R_3)$ wherein R, A, R_1 and R_2 are as defined above and R_3 denotes a hydrogen or an alkyl group having 1–8 carbon atoms.

4,874,554

QUATERNARY AMMONIUM COMPOUNDS

Fritz Lange, Essen; Peter Busch, Erkrath, and Klaus Thiele, Langenfeld, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

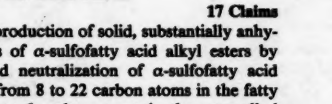
Filed Jul. 10, 1987, Ser. No. 72,379

Claims priority, application Fed. Rep. of Germany, Jul. 10, 1986, 3623215

Int. Cl.[4] C07C *107/08*

U.S. Cl. 260—404 5 Claims

1. A quaternary ammonium compound of the formula:



(I)

wherein:

R^1 is a C_{8-22} alkyl;

R^2 is a C_{7-21} alkyl;

R^3 is a $—(C_2H_4O)_z—H$, or $—(C_2H_4O)_z—COR^2$;

R^4 is a C_{1-4} alkyl or benzyl;

n is 2 or 3;

x is a number from 1 to 10;

y and z are each a number from 1 to 10; and

A is chloride, bromide, or $R^5OSO_3(-)$ where R^5 is a C_{1-4} alkyl.

4,874,555

SOYBEAN PROCESS

Ray Upchurch, Texarkana, Ark., assignor to The French Oil Mill Machinery Co., Piqua, Ohio

Filed May 2, 1988, Ser. No. 189,260

Int. Cl.[4] C11B *1/10*

U.S. Cl. 260—412.4 15 Claims

1. In a method for processing soybeans in which hull portions are separated from the kernel portions of the soybean, the improvement comprising cracking said kernels into a plurality of kernel portions, pulverizing said cracked kernel portions to form powder-like particles, steam-treating said pulverized kernels under pressure conditions, and forming porous pellets by passing said steam-treated particles through a die orifice.

4,874,556

PROCESS FOR THE DESENSITIZATION OF WATER-INSOLUBI.E PEROXYCARBOXYLIC ACIDS

Manfred Dankowski, Moembris-Koenigshofen, and Willi Hofen, Rodenbach, both of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 63,045, Jun. 17, 1987, abandoned. This application Oct. 28, 1988, Ser. No. 266,237

Claims priority, application Fed. Rep. of Germany, Aug. 25, 1986, 3628263

Int. Cl.[4] C07C *179/133*

U.S. Cl. 562—2 12 Claims

1. A process for the desensitization of water insoluble peroxycarboxylic acids with essentially sodium sulfate as the desensitizing agent, comprising contacting said peroxycarboxylic acids in the absence of an organic solvent with the desensitizing agent in the aqueous phase, which is essentially sodium sulfate to thereby obtain the desensitized peroxycarboxylic acids, separating said acids from mother liquor that is formed thereby, withdrawing heat from said mother liquor after separation of the desensitized peroxycarboxylic acids to thereby crystallize pure sodium sulfate in the form of the decahydrate or heptahydrate or mixtures thereof, separating the crystallized sodium sulfate hydrates free of impurities from the spent liquor which contained the impurities present in the desensitization process and is discharged from the system and returning

at least part of the separated sodium sulfate to the process for contacting with untreated peroxycarboxylic acids.

4,874,557

PROCESS FOR THE PREPARATION OF PERFLUORINATED CARBONYL FLUORIDES

Alfred Kruse, Kelkheim; Günter Siegemund, Hofheim am Taunus, and Werner Schwertfeger, Langgöns, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

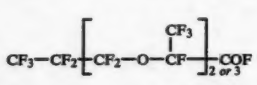
Filed Nov. 3, 1988, Ser. No. 266,919

Claims priority, application Fed. Rep. of Germany, Nov. 7, 1987, 3737920

Int. Cl.[4] C07C *51/29*

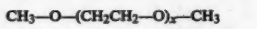
U.S. Cl. 562—851 8 Claims

1. A process for the preparation of perfluorinated carbonyl fluorides of the formula



(I)

by oligomerisation of hexafluoropropene oxide in the presence of a catalyst, wherein the catalyst comprises an alkali metal fluoride, a carboxylic acid dinitrile and an ether of the formula



(II)

in which x denotes an integer from 2 to 6.

4,874,558

POLYMER CATALYZED SYNTHESIS OF ACID ANHYDRIDES

Wilmer K. Fife, Indianapolis, Ind., and Zhi-Dong Zhang, Tianjin, China, assignors to Indiana University Foundation, Bloomington, Ind.

Continuation-in-part of Ser. No. 52,439, May 21, 1987. This application Dec. 13, 1988, Ser. No. 284,846

Int. Cl.[4] C07C *51/56*

U.S. Cl. 562—894 15 Claims

1. A process for preparing acid anhydrides comprising the step of:

reacting a carboxylic acid or carboxylate salt with an acid halide or acyl activating agent in the presence of a catalyst selected from the group consisting of a solid phase copolymer of 4-vinylpyridine, a solid phase copolymer of 4-vinylpyridine 1-oxide, and a water soluble homopolymer of 4-vinylpyridine 1-oxide at a temperature of about 0° C. to ambient.

4,874,559

PROCESS AND DEVICES FOR OPERATION OF AN APPARATUS WHICH FUNCTIONS BY USING A FLOW OF A LIQUID FILM

Pierre Brun, Grenoble, France, assignor to Compagnie Europeenne Du Zirconium Cezus, Courbevoie, France

Filed Jan. 19, 1989, Ser. No. 298,896

Claims priority, application France, Jan. 21, 1988, 88 01006

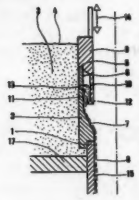
Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—67 17 Claims

1. A process for operating an apparatus such as an evaporator, absorber or exchanger, which functions using a flow of a plurality of liquid films over a plurality of flow surfaces, in which the liquid films are fed by gravity from a source which is permanently fed with a flow rate (d_1) which is slightly higher than the minimum flow rate (d_0) below which the film or films breaks or break down, comprising the steps of:

(a) firstly feeding each film with a permanent flow rate (kd_1) corresponding to the feed flow rate (d_1) of the source, k being 1 and equal to 1/n in the case of n identical flow surfaces;

(b) then for a brief period increasing the feed flow rate for each film to a transient value (kd_2) permitting a continuous film to be established over the whole of the corresponding flow surface;



(c) then returning the operation to the permanent feed flow rate (kd_1) for the film in question;

the short periods of feeding the flow surfaces at their transient flow rates (kd_2) being displaced in respect of time in relation to those different surfaces.

4,874,560

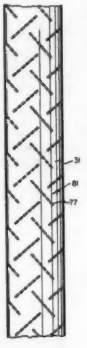
APPARATUS FOR EFFECTING SELECTED PATTERNS OF FLUID FLOW

James A. Titmas, Dallas, Tex., assignor to Oxidyne Corporation, Dallas, Tex.

Continuation of Ser. No. 204,130, Jun. 6, 1988, abandoned. This application Jun. 30, 1989, Ser. No. 373,685

Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—76 16 Claims



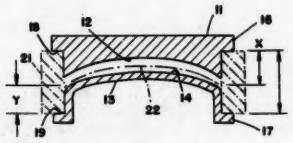
1. Apparatus for effecting a selected pattern of fluid flow comprising a body for separating a first fluid and second fluid having a first surface along which the first fluid flows, a second surface, and a plurality of discrete groupings of holes passing through the body from the second surface to the first surface through which a second fluid flows, wherein each grouping contains a plurality of closely associated holes arranged in a substantially straight line and each grouping is substantially perpendicular to the next successive grouping.

4,874,561

METHOD FOR DESIGNING PARAMETRIC MOLDING APPARATUS

David P. Spector, Sausalito, Calif., assignor to Sola USA, Inc., Petaluma, Calif.

Filed Mar. 3, 1988, Ser. No. 163,771
Int. Cl.[4] B29D *11/00*
U.S. Cl. 264—1.1 4 Claims



1. A method for producing ophthalmic lenses, comprising the steps of providing a first plurality of front surface molding dies having concave optical forming surfaces, providing a second plurality of rear surface molding dies having convex optical forming surfaces, providing a lens forming assembly adapted to retain an arbitrarily selected pair of dies comprising any one of said first plurality of front surface molding dies and any one of said second plurality of rear surface molding dies in confronting relationship, defining an imaginary molding reference curve disposed between said pair of dies, providing first spacing means for each of said first plurality of dies to interact with said lens forming assembly and space the respective concave optical forming surface of each of said first plurality of dies a first fixed distance from said reference curve, providing second spacing means for each of said second plurality of dies to interact with said lens forming assembly and space the respective convex optical forming surface of each of said second plurality of dies a second fixed distance from said reference curve, whereby the spacing at closest approach of any arbitrarily selected pair of dies is a constant, and thereafter forming a lens between said dies.

4,874,562

METHOD OF MOLDING A POLYVINYL ALCOHOL CONTACT LENS

Suong-Hyu Hyon, and Yoshito Ikada, both of Uji, Japan, assignors to Biomaterials Universe, Inc., Kyoto, Japan

PCT No. PCT/JP87/00082, § 371 Date Sep. 30, 1987, § 102(e) Date Sep. 30, 1987, PCT Pub. No. WO87/01524, PCT Pub. Date Aug. 27, 1987
PCT Filed Feb. 9, 1987, Ser. No. 117,171
Claims priority, application Japan, Feb. 13, 1986, 61-29189
Int. Cl.[4] B29D *11/00*
U.S. Cl. 264—1.4 5 Claims

1. A method of manufacturing a soft contact lens, comprising forming a solution of poly(vinyl alcohol) in a mixed solvent of water and an organic solvent in a weight ratio of water to organic solvent of 90:10 to 10:90, pouring the solution in a mold having a shape of a contact lens, crystallizing the poly(vinyl alcohol) at a temperature of not more than 0° C., taking the crystallized poly(vinyl alcohol) out of the mold, and then replacing the organic solvent in the crystallized poly(vinyl alcohol) with water.

4,874,563

PROCESS FOR PREPARING TOWS FROM COMPOSITE FIBER BLENDS

Paul McMahon, Mountainside; Tai-Shung Chung, Summit, and Lincoln Ying, Bridgewater, all of N.J., assignors to BASF Structural Materials Inc., Charlotte, N.C.

Continuation of Ser. No. 589,817, Mar. 15, 1984, abandoned. This application Dec. 5, 1986, Ser. No. 940,234
The portion of the term of this patent subsequent to Dec. 1, 2004, has been disclaimed.
Int. Cl.[4] D01G *13/00*
U.S. Cl. 264—29.2 20 Claims

1. A process for preparing a continuous, substantially uniform tow useful in forming composite molded articles which comprises:

(a) forming a continuous tow of continuous carbon fibers;

(b) forming a continuous tow of continuous thermoplastic polymers fibers having a melting point of at least about 50° C.;

(c) uniformly and continuously spreading the thermoplastic polymer fiber tow to a selected width to preserve the separation of the individual fibers;

(d) uniformly and continuously spreading the carbon fiber tow to a width that is essentially the same as the selected width for the thermoplastic polymer fiber tow;

(e) intimately, uniformly and continuously intermixing the spread carbon fiber tow and the spread thermoplastic polymer fiber tow in a relatively tension-free state by bringing the tows into simultaneous contact with each other in substantially the same area such that there is provided a substantially uniform distribution of the thermoplastic fibers and the carbon fibers within an intimately intermixed tow; and

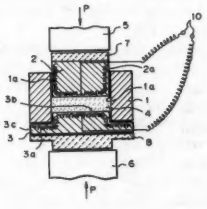
(f) continuously withdrawing the intimately intermixed tow.

4,874,564

MOLDING PROCESS AND DEVICE THEREFOR

Kiyoshi Sudani, and Yoshihiko Sunami, both of Kashima, Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

Filed Dec. 17, 1987, Ser. No. 134,057
Claims priority, application Japan, Dec. 18, 1986, 61-302345; Mar. 3, 1987, 62-048294
Int. Cl.[4] B29C *43/18, 43/36, 43/52*
U.S. Cl. 264—24.7 16 Claims



1. A method of molding a molding compound which contains pitch, wherein the pitch, when heated, melts with evolving gas and then sets or solidifies at a higher temperature, comprising the steps of:

putting the molding compound into a mold;

heating the molding compound under pressure at a tempera-

ture sufficient to cause the setting of the pitch wherein the molding compound is subject to a compressive force along a direction and the compound is heated on each of two ends which lie along the direction of the compressive force, whereby a temperature gradient is created along the direction of the compressive force, thereby progressively advancing the setting of said molding compound from one end of the molding compound which is at a higher temperature to the opposite end which is at a lower temperature;

cooling the molding compound after the molding compound has been set; and

removing the resulting molding from the mold.

16. A molding device for molding a molding compound comprising:

a mold frame having a bore extending therethrough, said mold frame being made of an iron alloy having a linear expansion coefficient ranging from 0 to $1.2\times10^{-6}/C°$;

upper and lower punches slidably inserted in said bore of the mold frame;

means for pressing said upper and lower punches against a molding compound poured into a space in the bore limited by said upper and lower punches; and

means for heating said upper and lower punches, said means for heating comprising means for separately heating said upper and lower punches.

4,874,565

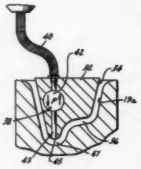
PLASTISOL SLUSH PROCESS

Frank J. Preston, Hampton, N.H., assignor to Ex-Cell-O Corporation, Troy, Mich.

Continuation of Ser. No. 851,017, Apr. 11, 1986, abandoned. This application Apr. 22, 1988, Ser. No. 185,101

Int. Cl.[4] B29B *17/00*; B29C *41/18*

U.S. Cl. 264—37 **4 Claims**



1. In an open mold method for coating a thin plastic shell on a heated surface of an open ended mold cavity block having an open end and a low point by use of a conversion process in which less than 10 percent of a liquid plastisol charge is deposited as gelled material on the heated surface and a remainder of the liquid plastisol charge is recylcled back to a source of plastisol and wherein cycle time of the process is limited by time required to circulate the liquid plastisol into and from the mold cavity to fully coat the heated surface thereon, the improvement comprising:

reducing fill volume in the open ended mold cavity block to substantially twenty percent of a volume of the open ended mold cavity block bounded by the heated surface of the open ended mold cavity block;

directing a charge of the liquid plastisol from a source of material through the open end of the mold into the low point thereof and filling the reduced fill volume to fully coat the heated surface of the open ended mold cavity bock with the liquid plastisol material;

recycling seventy-five percent of the liquid plastisol occupying the reduced fill volume and returning it to the source for reuse in subsequent filling of the reduced fill volume in the open ended mold cavity block;

providing a movable insert having a volume reducing position in an interior of the mold and a plastisol recovery position out of the mold interior, locating the movable insert in its volume reducing position to reduce the fill volume of the open ended mold only when liquid plastisol is being directed into the reduced volume;

and thereafter locating the insert in its plastisol recovery position for recovering plastisol waste from the insert as the liquid plastisol is being recycled back to the source.

4,874,566

METHOD AND DEVICE FOR PRODUCING SHAPED OBJECTS FROM THERMOPLASTIC PLASTICS

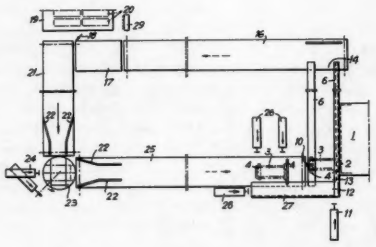
Uwe Heuschkel, Klosterstrasse 22, 6520 Worms, Fed. Rep. of Germany

Filed Jun. 4, 1987, Ser. No. 58,355

Claims priority, application Fed. Rep. of Germany, Jun. 6, 1986, 3619144

Int. Cl.[4] B29C *47/02, 47/92*

U.S. Cl. 264—40.2 **9 Claims**

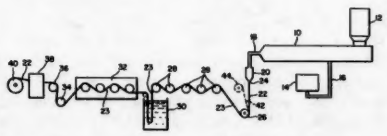


1. In a method for producing shaped objects from thermoplastics, particularly non-cleaned and non-sorted plastic refuse, comprising the steps of providing an extruder in which a plastic refuse is plasticized, providing mods for shaping objects, feeding a plasticized plastic from said extruder into said molds, cooling said molds, removing shaped objects from said molds and feeding said mods for refilling with plasticized plastic towards said extruder, the improvement comprising treating plastic refuse containing non-plastic inclusions in said extruder while milling and homogenously mixing said non-plastic inclusions with molten plastic and friction-heating and generating pressure up to about 140 Bar, closing one of said molds at least at end faces thereof by base plates one of which has a filling opening, displacing said one mold along guides extending transversely of a nozzle of said extruder from a storage position to a filling position with said base plate having said filling opening facing said nozzle, filling said one mold positioned against said nozzle with the plasticized plastic of about 100 kg under pressure generated in said extruder, applying to said one mold a displacing stroke when a required filling of said one mold in the filling position is reached, moving the filled one mold laterally of said nozzle over a waiting distance to a discharge position of said guides while maintaining said filling opening closed and simultaneously displacing another mold from the storage position towards said nozzle while an extruder-side base plate sealingly slides against edges of said nozzle during a mold exchange and closing said nozzle to prevent discharge of the filling plastic thereof during the mold exchange, removing said one mold from said discharge position and cooling said one mold, removing the shaped object from said one mold and feeding the emptied one mold to an input position of said guides, and repeating the same steps for said another mold.

4,874,567
MICROPOROUS MEMBRANES FROM POLYPROPYLENE

George Lopatin, Newton Centre; Larry Y. Yen, Tewksbury, and Randall R. Rogers, Billerica, all of Mass., assignors to Millipore Corporation, Bedford, Mass.

Filed Apr. 24, 1987, Ser. No. 42,138
Int. Cl.[4] B29D 27/04
U.S. Cl. 264—45.1 8 Claims

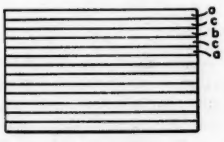


1. A process for forming a microporous polypropylene membrane which comprises the following steps in sequence:
(a) forming a melt-blend consisting essentially of polypropylene and a solvent capable of effecting solid liquid phase separations of polypropylene therefrom containing between about 5 and 20 weight percent polypropylene based upon the weight of the blend,
(b) shaping said melt-blend to form a shaped precursor to said membrane,
(c) cooling said shaped precursor to a temperature at which said solvent separates from polypropylene by solid-liquid phase separation to form a gel film,
(d) selectively extracting said solvent formed from said gel film in step (c) to form a microporous polypropylene membrane and
(e) drying said membrane from step (d) while said membrane is restrained to prevent said membrane from shrinking.

4,874,568
PROCESS OF MAKING A POROUS MEMBRANE

C. C. Chau, and Jang-hi Im, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 26, 1988, Ser. No. 249,035
Int. Cl.[4] B29C 43/30, 67/04, 67/20; B32B 31/24
U.S. Cl. 264—49 21 Claims



1. A process for preparing a microporous material comprising:
coextruding a plurality of interdigitated layers of at least a first polymeric material and a second different polymeric material to form a laminate product, such that said layers each have a thickness of from 0.03 to 5 microns, at least one of said polymeric materials having preferential solubility in a selected solvent with respect to the other of said polymeric materials;
pulverizing the resulting laminate product and recoextruding the pulverized product at least once to again form a layered material wherein each of said layers has a thickness of from about 0.03 to about 5 microns;
pulverizing said recoextruded material and forming a melt composition of the resulting pulverized granules into a thin, solid material;
contacting said solid material with an extraction medium which has a preferential solubility for at least one of said polymeric materials, whereby said preferentially soluble polymeric material is removed from said solid material to leave a porous material; and
separating said extraction medium from said porous unitary material.

4,874,569
CERAMIC COMPOSITE AND METHODS OF MAKING THE SAME

Jack A. Kuszyk, and Christopher R. Kennedy, both of Newark, Del., assignors to Lanxide Technology Company, LP, Newark, Del.

Filed Jan. 12, 1987, Ser. No. 2,048
Int. Cl.[4] C04B 35/71, 35/02
U.S. Cl. 264—60 23 Claims

1. A method for producing a self-supporting ceramic composite comprising (1) a ceramic matrix obtained by oxidation of a parent metal comprising an aluminum alloy to form a polycrystalline material comprising an oxidation reaction product of the parent metal with at least one oxidant; and (2) at least one filler embedded by the matrix, which method comprises:
(a) positioning a parent metal, comprising an aluminum alloy having at least about 1% by weight zinc, adjacent to a permeable mass of filler having at least one defined surface boundary and orienting said parent metal and said filler relative to each other so that formation of an oxidation reaction product of the parent metal with an oxidant will occur into said mass of filler and in a direction towards said defined surface boundary;
(b) heating said parent metal to a first temperature above its melting point but below the melting point of said oxidation reaction product to form a body of molten parent metal and reacting the molten parent metal with said oxidant at said first temperature to form said oxidation reaction product, and at said first temperature maintaining at least a portion of said oxidation reaction product in contact with and extending between said body of molten metal and said oxidant, to draw molten metal through the oxidation reaction product towards the oxidant and towards and into the adjacent mass of filler so that fresh oxidation reaction product continues to form within the mass of filler at an interface between the oxidant and previously formed oxidation reaction product, and continuing said reaction for a time sufficient to infiltrate said mass of filler to said defined surface boundary, with said ceramic matrix, said ceramic matrix containing at least some residual non-oxidized metallic constituents of said parent metal; and
(c) heating the resulting infiltrated mass of step (b) in at least one environment selected from the group consisting of an oxygen-containing atmosphere, an inert atmosphere and a vacuum to a second temperature above the first temperature but below the melting point of the oxidation reaction product to remove or oxidize at least a substantial portion of said residual non-oxidized metallic constituents of said parent metal without substantial formation of oxidation reaction product beyond said defined surface boundary, thereby producing a self-supporting ceramic composite.

4,874,570
METHOD OF MAKING A GAMES RACKET

Robert C. Haines, Huddersfield, England, assignor to Dunlop Limited, United Kingdom

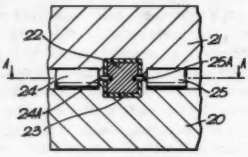
Filed Jun. 3, 1987, Ser. No. 56,944
Claims priority, application United Kingdom, Jan. 16, 1985, 85-01006
Int. Cl.[4] B29C 33/12, 45/36
U.S. Cl. 264—154 10 Claims

1. A method of molding a games racket frame of fiber reinforced plastic material comprising a hollow head and shaft, in which the head and shaft are integrally-molded, said method comprising
injecting thermoplastics material into an injection mold and

around a fusible core, the core having the desired internal shape of the head and shaft and having a melting point below the injection temperature,

supporting the shaft portion of the core in the injection mold adjacent its head end and in the region of the eventual handle,

positioning at least one pair of locating means in the shaft portion between the head end and handle region of the shaft, one of each pair of said locating means lying on opposite sides of the shaft portion of the core, the locating means being positioned to correspond to the neutral surface of the eventual shaft and projecting through the thermoplastics material, said neutral surface being the



notional surface of the shaft in which there are no tensile or compressive stresses in the shaft when the shaft is subject to flexure by the racket contacting a ball, positioning said at least one pair of locating means longitudinally of the shaft so that the greatest unclamped length of the shaft portion of the core between supports, divided by the depth of the shaft portion of the core, is less than 10,

allowing the molding to set, then raising the temperature to an amount sufficient to melt the core but insufficient to melt or deform the molding and

removing the molten core and the locating means so as to leave a pair of holes corresponding to each said pair of locating means.

4,874,571

APPARATUS FOR CALENDERING PLASTIC WEB EXTRUDED FROM A SLOT DIE

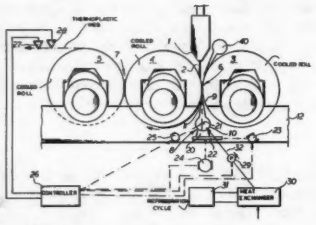
Heinz Müller, Windeck, Fed. Rep. of Germany, assignor to Reifenhauser GmbH & Co. Maschinenfabrik, Troisdorf, Fed. Rep. of Germany

Filed Jan. 11, 1988, Ser. No. 142,466

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1987, 3702945

Int. Cl.[4] B29C *47/90*

U.S. Cl. 264—175 **15 Claims**



1. An apparatus for calendering a plastic web extruded from a slot die, said apparatus comprising at least two cooled calendering rolls said rolls operating in conjunction with each other and together defining a calendering nip, said slot die being positioned on one side of said calendering nip, said plastic web continuously coming off the first of said rolls and being threaded around the second of said rolls, and having in the region of said calendering nip a blowing device for cooling gas, said blowing device providing cooling gas along the length of said calendering nip into the channel between the first of said rolls and the plastic web coming off the roll, and said blowing device being a blowing duct extending the breadth of said calendering rolls, and having a slot aperture for said cooling gas.

11. A method for calendering a plastic web comprising the steps of:

extruding a plastic through a slot die to form said plastic web;

directing said extruded plastic web into a calendering nip formed between a first and a second cooled calendering roll and operating said rolls in relative counterrotation, said slot die being positioned on one side of said rolls;

threading said plastic web continuously coming off the first calendering roll around the second calendering rolls; and

blowing cooling gas from a blowing device along the length of said calendering nip into a channel between the first of said rolls and the plastic web coming off the roll.

4,874,572

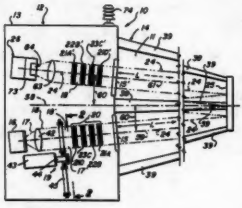
METHOD OF AND APPARATUS FOR MEASURING VAPOR DENSITY

Loren D. Nelson, Morrison, and Todd A. Cerni, Littleton, both of Colo., assignors to Ophir Corporation, Colo.

Filed May 6, 1987, Ser. No. 46,286

Int. Cl.[4] G21C *17/00*; G01J *1/00*

U.S. Cl. 376—256 **32 Claims**



1. In an apparatus for measuring the concentration of individual components of a multi-component system, said apparatus being in the form of a hygrometer, wherein said multi-component system includes at least water vapor in the coolant-gas stream of a gas-cooled nuclear reactor, said apparatus including means for transmitting an electromagnetic radiation input signal through a sample that has at least one of said system components therein, said electromagnetic radiation input signal being within a broad wavelength band that includes a given wavelength selected for strong absorption by said one component in said sample; the improvement comprising:

means responsive to said electromagnetic radiation input signal after transmission thereof through said sample for generating an output signal indicative of the concentration of said one component in said sample, said generating means including means fabricated from indium arsenide and being linearly responsive to said transmitted electromagnetic radiation input signal at said given wavelength and over a relatively wide portion of said wavelength band of said input signal for generating said output signal, said indium arsenide generating means being positioned to respond to the electromagnetic radiation input signal after transmission through said coolant-gas stream and any water vapor therein.

4,874,573
LID ARRANGEMENT

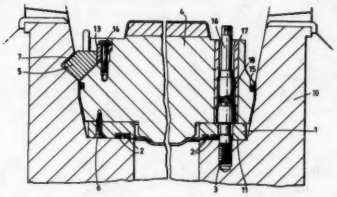
Ian A. Wood, Rothley, and Edward A. Horsfield, Cheltenham, both of England, assignors to The English Electric Company Limited, England

Filed Mar. 22, 1988, Ser. No. 171,689

Claims priority, application United Kingdom, Apr. 3, 1987, 8707972; Jan. 15, 1988, 8800887

Int. Cl.[4] G21F *5/00*

U.S. Cl. 376—272 **13 Claims**



4. A container comprising, in combination:

(A) a vessel having an opening; and

(B) a lid assembly to be secured in said opening to seal said opening, said lid assembly including

(i) a deformable inner lid member,

(ii) an outer lid member,

(iii) means for securing said inner and outer lid members together to form a single unit which is to be inserted, inner lid member first, into said opening,

(iv) means for attaching said inner lid member to said vessel so that, in use, said inner lid member seals said opening,

(v) stop means associated with said outer lid member,

(vi) said securing means being operative for releasing said outer lid member from said inner lid member on the occurrence of a fault condition which results in deformation of said inner lid member, thereby allowing said outer lid member to move relative to said vessel, and

(vii) said stop means then being operative for restricting the extent of movement of said outer lid member relative to said vessel so as to limit the degree of deformation of said inner lid member and prevent leakage of the seal.

4,874,574
CONTROL ROD

Takao Igarashi; Satoshi Sugawara; Yuichiro Yoshimoto, all of Hitachi; Shozo Saito, Mito; Takashi Fukumoto; Zenichiro Endo, both of Hitachi, and Katsutoshi Shinbo, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 9, 1987, Ser. No. 23,230

Claims priority, application Japan, Mar. 14, 1986, 61-54819; Mar. 20, 1986, 61-60579; Apr. 11, 1986, 61-82118; Nov. 12, 1986, 61-267612

Int. Cl.[4] G21C *7/10*

U.S. Cl. 376—333 **28 Claims**

1. In a boiling water nuclear reactor having a core, control rods for controlling the reactivity of said core, and insertion means disposed below said core for inserting said control rods into said core, each said control rod comprising:

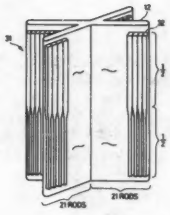
a neutron absorption region containing therein neutron absorbers made of absorption nuclear chain type neutron absorber in which nuclides that absorb further neutrons appear in the nuclides formed by the neutron absorption reaction or disintegrated nuclides thereof and which are low in attenuation speed of the neutron absorption effect; and

means for supporting said neutron absorbers in a predetermined position so as to prevent axial and radial movement thereof;

wherein said neutron absorption region is divided into upper and lower regions in an axial direction of said control rod, said upper and lower regions having identical neutron absorbers, and said upper region of said control rod is inserted into said core by said insertion means before insertion of said lower region into said core by said insertion means;

the quantity of said absorption nuclear chain type neutron absorber contained in said lower region in a section perpendicular to the axial direction is smaller than the quantity of said absorption nuclear chain type neutron absorber contained in said upper region in a section perpendicular to the axial direction; and

a boundary between said upper and lower regions at which the quantity of said absorption nuclear chain type neutron absorber physically changes in the axial direction between said upper and lower regions is positioned within a range of from $\frac{1}{3}$ to $\frac{1}{2}$ of the full length of said neutron absorption region in the axial direction from a lower end of said neutron absorption region.



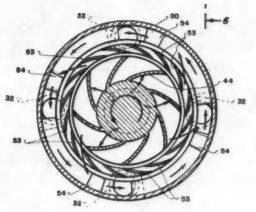
4,874,575
MULTIPLE DISCHARGE CYLINDRICAL PUMP COLLECTOR

Charlton Dunn, Calabasas; Robert J. Bremner, Woodland Hills, and Sen Y. Meng, Reseda, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Continuation of Ser. No. 69,994, Jul. 6, 1987, abandoned. This application Sep. 15, 1988, Ser. No. 246,888

Int. Cl.[4] G21D *1/04*

U.S. Cl. 376—404 **2 Claims**



1. In an improved method for circulating fluid coolant through a reactor core of a pool-type nuclear reactor having a sealed containment vessel containing a reactor core submersed in a body of liquid coolant, said method for circulating coolant including utilization of a rotary pump including an impeller for producing a highly circumferential flow of cooling fluid and a method for collecting and discharging coolant fluid, the improvement to the method of collecting and discharging coolant fluid including the steps of:

(1) producing a substantially uniform circumferential flow of

the fluid by directing said flow through a plurality of diffuser vanes and into an annular collector located radially outboard from said impeller, said annular collector having an entirely closed outer periphery; and

(2) turning said flow of cooling fluid into a substantially axially direction while maintaining a substantially constant average flow velocity by directing the coolant flow from said annular collector into a plurality of individual passageways located in an axial position relative to said annular collector.

4,874,576

METHOD OF PRODUCING NODULAR CAST IRON

Karl J. Reifferscheid, Karben, Fed. Rep. of Germany, assignor to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 19, 1989, Ser. No. 300,330

Claims priority, application Fed. Rep. of Germany, Jan. 23, 1988, 3801917

Int. Cl.[4] C22C *33/08*

U.S. Cl. 420—22 12 Claims

1. A method of producing nodular cast iron which comprises the steps of:

(a) forming a cast iron melt in a furnace;

(b) tapping said cast iron melt from said furnace in a stream into a receiver for said cast iron;

(c) continuously adding to said cast iron melt in said stream during the tapping of said cast iron melt and in a first treatment stage, a quantity of at least one rare earth metal in a form of steel-sheathed wire in an amount sufficient to convert oxygen and sulfur contained in the tapped melt to finely dispersed nonmetallic phases of rare earth oxide, rare earth oxysulfide and rare earth sulfide; and

(d) thereafter adding magnesium metal to the tapped melt without rare earths in a second treatment stage, in a form of a steel-sheathed wire, and in an amount sufficient for the formation of predominantly nodular graphite in the cast iron upon solidification thereof, the amount of said magnesium metal added being sufficient to impart to the cast iron a residual magnesium content of substantially 0.02 and 0.07% by weight and a residual sulfur content of substantially 0.005 to 0.025% by weight.

4,874,577

WEAR-RESISTANT INTERMETALLIC COMPOUND ALLOY HAVING IMPROVED MACHINEABILITY

Saburo Wakita, and Junji Hoshi, both of Omiya, Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 938,005, Dec. 4, 1986, abandoned. This application Nov. 9, 1987, Ser. No. 120,177

Claims priority, application Japan, Dec. 23, 1985, 60-289600; Feb. 12, 1986, 61-28508; Feb. 12, 1986, 61-28509; Feb. 12, 1986, 61-28510

Int. Cl.[4] C22C *14/00, 19/03, 19/07, 30/00*

U.S. Cl. 420—417 14 Claims

1. A wear-resistant intermetallic compound alloy having superior machineability which consists essentially of: (i) 45–60% of Co or (ii) a Co and Ni content of 45–60% with the Co content being at least 5%; at least one of 0.1–2% of Hf and 0.05–2% of Re; 0.1–2% of at least one element selected from the group consisting of Si, P, Cu, Zn, Ga, Ge, Cd, In, Sn, Sb, Pb, and Bi; 0–2% of C; and 0–5% of at least one element selected from the group consisting of Zr, Fe, V, Nb, Ta, Cr, Mo, W and Mn; the balance being Ti and incidental impurities, the percent being atomic percent.

4,874,578

ALUMINIUM ALLOY FOR SUPERPLASTIC FORMING

Heinrich Homberger, Beringen, Switzerland; Jürgen Timm, Steisslingen, Fed. Rep. of Germany, and Pedro Rodriques, Lisboa, Portugal, assignors to Swiss Aluminium Ltd., Chippis, Switzerland

Filed Jun. 20, 1988, Ser. No. 209,081

Claims priority, application Switzerland, Jun. 23, 1987, 2359/87

Int. Cl.[4] C22C *21/00*

U.S. Cl. 420—541 12 Claims

1. An aluminum alloy having excellent superplastic forming properties, the alloy consisting essentially of:

0.8–2.5% of iron,

3.5–6.0% of magnesium,

0.1–0.6% of manganese,

0.05–0.5% of zirconium,

at most 6.0% of zinc,

at most 3.0% of copper,

at most 0.3% of silicon,

at most 0.05% of titanium,

at most 0.05% of chromium,

and

the balance being substantially aluminum of commercial purity.

4,874,579

ACYLATED 3-AMINO-1,2,4-TRIAZOLES AS CORROSION INHIBITORS FOR NON-FERROUS METALS

Karl-Heinz Schmid, Mettmann; Josef Penninger, Hilden, and Hinrich Moeller, Monheim, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

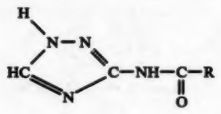
Filed Jun. 12, 1987, Ser. No. 62,294

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1986, 3620025

Int. Cl.[4] C23F *11/04, 11/00*

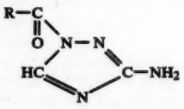
U.S. Cl. 422—16 11 Claims

1. A method for corrosion inhibition for noferrous metals which contact an aqueous medium, oils and oil-containing emulsions, comprising: incorporating in said aqueous medium, oils, or oil-containing emulsions, which contact a non-ferrous metal, a corrosion-inhibition-effective amount of at least one 3-acylamino-1,2,4-triazole compound of the formula



(I)

and/or at least one 1-acyl-3-amino-1,2,4 triazole compound of the formula



(II)

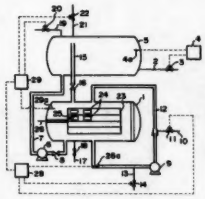
wherein R is an unsubstituted linear or branched C_{1-11} alkyl, whereby corrosion of the non-ferrous metal is inhibited by the presence of said at least one triazole compound.

4,874,580

PRESSURE-CONTROLLING METHOD

Ko Sugisawa; Yasushi Matsumura, both of Nara; Hidefumi Okamoto, Sakai, and Hiroshi Hayami, Nara, all of Japan, assignors to House Food Industrial Company Limited, Japan

Continuation of Ser. No. 743,952, Jun. 12, 1985, abandoned. This application Sep. 14, 1987, Ser. No. 97,401
Claims priority, application Japan, Jun. 12, 1984, 59-121066
Int. Cl.[4] A23L *3/12;* A61L *2/06*
U.S. Cl. 422—25 1 Claim



1. A method for sterilizing a sealed package containing air, comprising the steps of placing the package in a sealable treatment tank, sealing said sealable treatment tank, introducing hot water into said sealable treatment tank at a predetermined temperature, further heating said hot water to another predetermined temperature and maintaining said other predetermined temperature constant for a predetermined time, removing said hot water while introducing hot water for a predetermined cooling period of time within said sealable treatment tank during said steps of introducing hot water, further heating said hot water and maintaining said other predetermined temperature to change the rate-of-change of said pressure to near a point-of-change in a pressure rise in said package and controlling said pressure within said sealable treatment tank during said step of removing said hot water while introducing cool water for said predetermined cooling period of time whereby the lowering of pressure in the treatment tank begins at a period within the range of 30% of the predetermined cooling period of time to maintain the pressure in said sealable treatment tank near a point-of-change of the pressure within said package.

4,874,581

O_2/CO_2 CONTROL IN BLOOD OXYGENATORS

Karl M. Sutherland, Westminster, and Matthew Jenussaitis, Irvine, both of Calif., assignors to Baxter International Inc., Deerfield, Ill.

Continuation of Ser. No. 874,288, Jun. 13, 1986, abandoned. This application Jul. 7, 1988, Ser. No. 216,070
Int. Cl.[4] A61M *1/32*
U.S. Cl. 422—46 8 Claims

1. A blood oxygenator comprising:

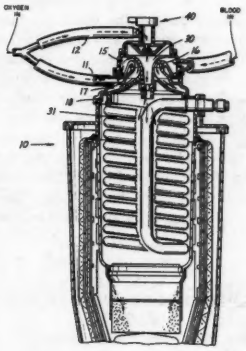
a housing which defines a blood receiving compartment, said housing having blood inlet and outlet ports which communicate with said blood receiving compartment through which blood enters and exits said compartment, said housing further having a plurality of gas inlet ports which communicate with said blood receiving compartment through which an oxygen enriched gas enters said compartment;

means which selectively communicates with said gas ports for defining at least two gas flow pathways through said compartment;

a difuser means associated with a first of said pathways which is operable for fractioning said gas into a plurality of microbubbles which are dispersed in any of said blood in said compartment;

a gas feed means associated with a second of said gas pathways which is operable for dispersing a substantially continuous, unsparged defined volume of gas in any of said blood in said compartment separate from said microbubbles dispersed in said body by said fractioning means;

wherein said housing compartment includes first a second portions for receiving said blood from said blood inlet ports, said first portion being positioned to receive said plurality of microbubbles from said diffuser means, and



said second portion being positioned to receive said substantially continuous, unsparged flow of gas from said gas feed means, said first and second portions being in at least partial fluid communication; and

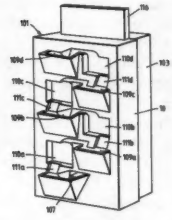
means associated with both of said gas flow pathways which is operable for controlling the flow of gas between said pathways.

4,874,582

SAMPLE HANDLING UNIT FOR CENTRIFUGATION

Alan J. Gordon, Liverpool, and Donald G. Billington, Stoke on Trent, both of England, assignors to Shandon Scientific Limited, Runcorn, England

Continuation-in-part of Ser. No. 871,081, Jun. 5, 1986, abandoned. This application Oct. 19, 1987, Ser. No. 109,584
Claims priority, application United Kingdom, Jun. 10, 1985, 8514590
Int. Cl.[4] G01N *35/00*
U.S. Cl. 422—102 8 Claims



1. For centrifugation apparatus, a sample handling unit comprising a body having means therein defining:

a sample chamber adapted to receive fluent sample material when the body is in a vertically arranged position for centrifugation and having a deposition chamber with an open side,

means for receiving a deposit receiving element with a deposit receiving surface juxtaposed to the open side of the deposition chamber to receive thereon sample material

under the influence of an artificial gravitational field effected by centrifugation,

a treatment fluid reservoir having an upper opening and adapted to receive retain treatment fluid when the body is in a vertically arranged position for centrifugation and in the absence of an artificial gravitational field,

means through which sample material may be supplied to the sample chamber through and upper opening therein without passages through the treatment fluid reservoir,

a buffer chamber constructed and arranged relatively to the treatment fluid reservoir to receive therefrom treatment fluid therein under the influence of an artificial gravitational field effected by centrifugation, and

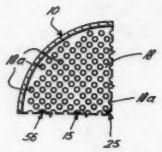
flow path means including a weir communicating the buffer chamber with the sample chamber constructed and arranged to retain treatment fluid in the buffer chamber while said artificial gravitational field is maintained by to allow flow of treatment fluid in said flow path means when said artificial gravitational field is reduced.

4,874,583

BUBBLE CAP ASSEMBLY IN AN EBULLATED BED REACTOR

James H. Colvert, Houston, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Nov. 27, 1987, Ser. No. 125,834
Int. Cl.[4] B01J 8/18
U.S. Cl. 422—143 **3 Claims**



3. In combination with a high pressure reaction vessel adapted for the reaction of a fluid hydrocarbon feed with hydrogen rich gas at elevated temperatures and pressures in the presence of a bed of a particulate solid catalyst, said reaction being the type wherein the gas and feed materials are passed upwardly through the bed at velocities whereby the bed is expanded to a volume greater than its static volume and the particulate solid catalyst is put in a state of random motion and wherein the mixture of fluid hydrocarbon, gas and solid constitute a turbulent zone wherein minimum solid settling takes place, the lower portion of which is defined by a transversely extending partition having a plurality of substantially regularly and uniformly disposed perforations extending through the partition;

a bubble cap assembly including risers being mounted in said perforations and including caps surmounting said risers, said risers having fluid flow ports above said partition, said bubble cap assembly having a ball check valve in the riser to prevent downflow of said particulate solid catalyst, and restricting the downflow of fluid, said ball check valve including a ball and a valve seat, said valve seat having an orifice adapted to be substantially closed by the ball, said orifice having a smaller internal diameter than that of the riser such that the velocity of the liquid flowing through said orifice is in excess of the transport velocity within said riser whereby catalyst particles entering said riser will be carried through said orifice, wherein the improvement comprises:

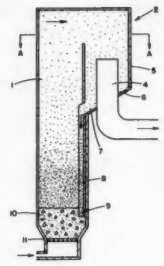
said riser containing an orifice mixer upstream of said valve seat orifice.

4,874,584

FLUIDIZED BED REACTOR

Seppo Ruottu, Karhula, Finland, assignor to A. Ahlstrom Osakeyhtio, Karhula, Finland

Continuation-in-part of Ser. No. 397,363, Jul. 12, 1982, abandoned. This application Dec. 20, 1984, Ser. No. 684,016
Int. Cl.[4] F27B 15/09, 15/12
U.S. Cl. 422—145 **6 Claims**



1. In a fluidized bed reactor wherein solid particles are entrained by gases flowing through the reactor, solids are separated from the gases and are returned to the lower part of the fluidized bed reactor, said reactor having in the upper part a chamber, a cyclone separator connected to said chamber, said cyclone separator having a vortex chamber, a return pipe for returning the solids separated from the gases to the lower part of the fluidized bed reactor, a discharge pipe for removal of the gases, the improvement which comprises the vortex chamber being inclined towards the reactor, the gas discharge pipe going through the bottom of the vortex chamber and directing downwards the gases from which the solid material has been removed, the gas discharge pipe is arranged so that its walls form a cylindrical partition between the solid particles and the gas in the bottom of the vortex chamber, and the discharge pipe has a diameter not less than 0.25D and not greater than 0.6D, wherein D is the diameter of said vortex chamber.

4,874,585

ECONOMIC RECOVERY AND UTILIZATION OF BOILER FLUE GAS POLLUTANTS

Arthur F. Johnson, Boulder, Colo., and Robert L. Sackett, Los Angeles, Calif., assignors to RCM Industries Corporation, Los Angeles, Calif.

Filed Mar. 8, 1988, Ser. No. 165,312
Int. Cl.[4] B01J 8/12
U.S. Cl. 422—171 **33 Claims**

1. An article of manufacture for removing SO_2, NOx and other pollutants from a flue gas stream containing these pollutants, comprising:

a horizontal housing defining a duct for flow of flue gas therethrough;

at least three vertical beds of particulates disposed in succession transversely in said duct, whereby said flue gas flows in succession through each of said beds;

means for supplying a particulate material for removing entrained fly ash from said flue gas stream to a first one of said beds;

means for supplying a particulate material for removing sulfuric acid from said flue gas stream to a second one of said beds;

a third one of said beds comprising a regenerable particulate catalyst for carrying an alkali reactant thereon for reacting with sulfur dioxide in said flue stream;

means for injecting an alkali material into said flue gas stream upstream of said third bed; and

means for inducing high velocity turbulent flow of said flue gas through said at least three beds.

4,874,586

RAGHOUSE BAG DESIGN FOR SIMULTANEOUS PARTICULATE CAPTURE AND CHEMICAL REACTION

Thomas Szymanski, Stow, Ohio, and Stephen M. Turner, Richmond, Tex., assignors to Norton Company, Worcester, Mass.

Filed Dec. 3, 1987, Ser. No. 128,558
Int. Cl.[4] B01D *46/02*
U.S. Cl. 422—177 **3 Claims**

1. Bag for use in removing particulate from a gas stream and simultaneously treating undesirable gaseous components of the gas stream, comprising:

(a) a first tubular porous wall,

(b) a second tubular porous wall mounted in telescoping, coextensive relationship inwardly of the first tubular wall to define a space between the two walls,

(c) means located at substantial longitudinal intervals between the tubular walls to divide the space into a plurality of discrete compartments,

(d) solid particles of chemical contained in each of the compartments, the chemical particles acting to treat an undesirable gaseous component,

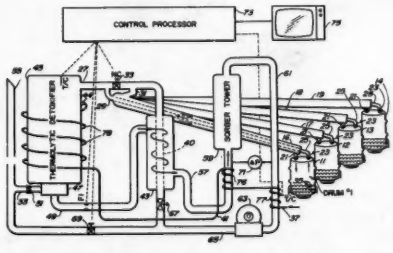
wherein passage of a gas stream laterally through the tubular walls and space therebetween initially encounters the first wall and deposits particulate thereon, the gas stream subsequently passing through the particles of chemical and the second wall.

4,874,587

HAZARDOUS WASTE REACTOR SYSTEM

Terry R. Galloway, Berkeley, Calif., assignor to Thermolytic Decomposer, Richmond, Calif.

Continuation-in-part of Ser. No. 903,235, Sep. 3, 1986, abandoned. This application Aug. 26, 1987, Ser. No. 89,573
Int. Cl.[4] B01J *10/00*
U.S. Cl. 422—189 **11 Claims**



1. A method for noncombustively decomposing organic compounds, comprising passing a gaseous mixture of the organic compounds and water into a reactor which includes a reaction zone having a temperature range between about 200° C and 1820° C to noncombustively decompose the organic compounds in the gaseous mixture, maintaining the ratio of water to organic compounds present in said gaseous mixture in said reaction zone such that the amount of water is greater than the stoichiometric amount necessary to combine with 100% of the organic compounds present in the gaseous mixture, and maintaining a residence time and mixing of said gaseous mixture and said water in said reaction zone to react substantially all of said organic compounds with said water to produce carbon monoxide and hydrogen as reaction product.

4,874,588

METHOD AND APPARATUS FOR RAPIDLY DISSOLVING POLYMERS IN WATER

Edwin T. Sortwell, Wheaton; Manuel Slovinsky, Woodridge, and Alan R. Mikkelsen, Downers Grove, all of Ill., assignors to Diatec Polymers, Batavia, Ill.

Division of Ser. No. 594,559, Mar. 29, 1984, Pat. No. 4,529,794. This application Mar. 5, 1985, Ser. No. 708,247
Int. Cl.[4] C08C *1/00*
U.S. Cl. 422—269 **33 Claims**

1. An apparatus for rapidly dissolving particles of a water soluble polymer in water, comprising:

(a) a mixing apparatus for contacting said particles with water to form a suspension of said particles in water communication with;

(b) a particle size reduction apparatus for subjecting said suspension to instantaneous and momentary conditions of high cutting shear simultaneously with or immediately after formation of said suspension of finely divide said particles without substantial molecular degradation of said polymer to form a solution of said polymer in water; and,

(c) means for discharging said solution from said particle size reduction apparatus immediately after formation with said solution.

4,874,589

METHOD FOR DESULFURIZATION OF SULFUR OR HYDROGEN SULFIDE-CONTAINING GASES

Lothar Görlich, Dissen, Fed. Rep. of Germany, assignor to UTB Umwelttechnik Buchs AG, Buchs, Switzerland

Continuation of Ser. No. 916,715, Oct. 8, 1986, abandoned. This application Apr. 28, 1988, Ser. No. 188,742
Claims priority, application Switzerland, Oct. 11, 1985, 4394/85
Int. Cl.[4] C01B *17/05*
U.S. Cl. 423—220 **23 Claims**

1. Method of desulfurization of gases containing sulfur contaminants,

utilizing the steps of

providing reservoirs (27, 31, 33) of washing or scrubbing liquid;

washing the gas in an absorber (11) with a washing liquid and thereby forming a contaminated liquid including sulfur compounds in the washing liquid;

circulating the washing liquid in a first scrubbing loop from said reservoir (31) through said absorber (11) back to reservoir (31) at a first flow rate and in a second regenerating loop, through a regenerator vessel (59) and back into said reservoir (35) at a second flow rate;

in said second loop, aerating and oxidizing the sulfur compounds and decontaminating the washing liquid by introducing a gas containing oxygen to the washing liquid;

removing elemental sulfur from the oxidized liquid and introducing the decontaminated liquid via said reservoir (33) into the first loop prior to the washing step,

wherein the aerating and oxidizing step comprises

introducing oxygen to the contaminated liquid in said regenerator vessel (59) under hyperbaric pressure

which is sufficient to effect oxidation of hydrogen sulfide to elemental sulfur, drawing off a portion of said liquid in said regenerator vessel at a third flow rate and contacting said portion with said oxygen while reintroducing said portion into said regenerator vessel;

and wherein the step of circulating the washing liquid prior to reintroduction of the liquid to the washing step comprises

the step of degassing the liquid, after the aerating and oxidizing step in said regenerator vessel (59).

4,874,590

CATALYTIC REDUCTION OF NITROGEN OXIDES

Mark T. Stanilulis, Peekskill, N.Y., and Alan P. Risch, New Fairfield, Conn., assignors to UOP, Des Plaines, Ill.

Filed Apr. 7, 1988, Ser. No. 178,912
Int. Cl.[4] B01J *8/00;* C01B *21/00, 17/00*
U.S. Cl. 423—239 26 Claims

1. A method for catalytically reducing one or more nitrogen oxides from a gaseous stream containing one or more nitrogen oxides and one or more sulfur oxides which comprises contacting said gaseous stream and ammonia with a microporous non-zeolitic molecular sieve composition at effective reduction conditions, wherein said microporous non-zeolitic molecular sieve composition is hydrogen-forming cation exchanged prior to said contacting in said method.

4,874,591

PROCESS FOR THE PURIFICATION OF WASTE GASES CONTAINING HYDROCHLORIC ACID AND SULPHUR DIOXIDE

Josef Jeney, Vienna, Austria, assignor to Maschinenfabrik Andritz Actiengesellschaft, Graz-Andritz, Austria

Filed Jul. 28, 1988, Ser. No. 225,380
Claims priority, application Austria, Jul. 29, 1987, 1915/87
Int. Cl.[4] C01B *7/00, 17/00, 7/01*
U.S. Cl. 423—240 7 Claims

1. A process for the purification of a waste gas containing hydrochloric acid and sulphur dioxide comprising the steps of:

contacting a waste gas containing hydrochoric acid and sulphur dioxide with a magnesium-containing scrubbing agent to produce reaction products, said magnesium-containing scrubbing agent being free of gypsum;

adding a calcium-containing reagent to said reaction products to produce a chloride-containing liquid and a precipitate of particulate calcium sulphate; and then

subjecting said chloride-containing liquid to pyrohydrolysis to produce hydrochloric acid of 16 to 30 mass % and to regenerate said magnesium-containing scrubbing agent.

4,874,592

PRODUCTION PROCESS OF XENON

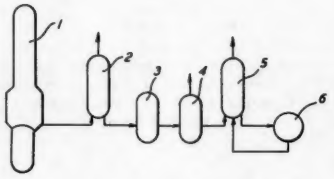
Masami Shino; Hideaki Takano; Jitsuo Nakata, and Katsuhiko Noro, all of Wakayama, Japan, assignors to Kyodo Oxygen Co., Ltd., Japan

Filed Aug. 23, 1988, Ser. No. 235,328
Int. Cl.[4] B01D *53/04, 53/36;* C01B *23/00*
U.S. Cl. 423—262 9 Claims

1. A process for the production of Xenon that includes the steps of

venting liquid oxygen from the rectifying column of an air separator sequentially into a plurality of adsorption-desorption stages which contain columns filled with an adsorbent for adsorbing Xenon from the vented liquid oxygen,

adsorbing and desorbing Xenon sequentially in each of the adsorption-desorption stages to concentrate the recovered Xenon,



catalytically removing hydrocarbon substances (CmHn) from Xenon gas recovered from the first adsorption-desorption stage.

4,874,593

CONVERSION OF PYROPHORIC P_4-CONTAINING MATERIAL TO P_2O_5 MATERIAL

Auston K. Roberts, Chino; William E. Trainer, Anaheim, both of Calif., and David L. Biederman, Columbia, Tenn., assignors to Stauffer Chemical Company, Shelton, Conn.

Continuation-in-part of Ser. No. 894,529, Aug. 8, 1986, Pat. No. 4,686,904. This application Jul. 27, 1987, Ser. No. 78,430
The portion of the term of this patent subsequent to Aug. 8, 2004, has been disclaimed.
Int. Cl.[4] C01B *25/12, 25/01, 25/02, 25/04*
U.S. Cl. 423—322 5 Claims

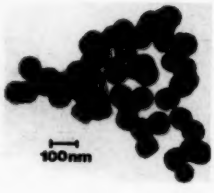
1. A process for treating a pyrophoric P_4-containing material to convert at least a portion of it to substantially non-pyrophoric P_2O_5 material which comprises supplying streams of fluid P_4-containing material and an oxygen-containing gas to a reactor filled with water such that the P_4-containing material and oxygen in the oxygen-containing gas react with one another after both have entered the aqueous medium within the reactor to thereby form the P_2O_5 material.

4,874,594

SILICA WITH A HIGH OIL ABSORPTION CAPABILITY AND A CONTROLLED PRIMARY STRUCTURE AND PROCESS FOR THE PRODUCTION THEREOF

Yvonick Chevallier, Decines, France, assignor to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

Division of Ser. No. 879,492, Jun. 24, 1986, Pat. No. 4,708,859, which is a continuation of Ser. No. 753,874, Sep. 11, 1985, abandoned. This application Aug. 5, 1987, Ser. No. 81,980
Claims priority, application France, Jul. 11, 1984, 84 11004
Int. Cl.[4] C01B *33/12*
U.S. Cl. 423—335 10 Claims



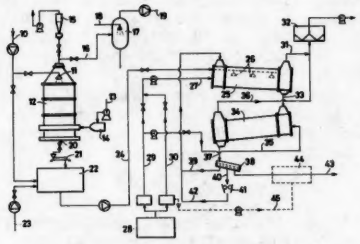
1. A precipitated silica in the form of aggregates having a means projected area by number of said aggregates higher than about 8,000 nm^2, and further having an inter-aggregate pore volume of about 1 cm^3/g or higher and having a homogeneous inter-aggregate pore population.

4,874,595

PROCESS FOR PRODUCING CALCIUM-UREA NITRATE

Antonio Crispoldi; Andrea Moriconi, both of Terni, and Mario Chiappafreddo, Amelia, all of Italy, assignors to Enichem Agricoltura S.p.A., Palermo; CCM S.r.l., Amelia and Tecnocentro S.r.l., Terni, all of, Italy

Filed Feb. 5, 1988, Ser. No. 152,854
Claims priority, application Italy, Feb. 13, 1987, 19363A/87
Int. Cl.[4] C06B *1/04*
U.S. Cl. 423—397 14 Claims



1. A process for the production of calcium-urea nitrate as a granular, free-flowing solid free from the tendency of forming dust, comprising:

(a) preparing a liquid composition containing urea nitrate and calcium nitrate in a molar ratio of about or equal 4:1 at a temperature not greater than 170° C., said composition having a water content ranging from 0 to 15% by weight;

(b) spraying said liquid composition under pressure of a hot gas and at a temperature equal or about equal to its temperature of formation through spray nozzles provided within a revolving drum onto moving solid particles of calcium-urea nitrate within the drum, which particles are at a temperature of 40° to about 100° C., the salt particles within the drum being under a stream of gas; and

(c) recovering calcium-urea nitrate from the solid product within the drum.

4,874,596

PRODUCTION OF CRYSTALLINE STRUCTURES

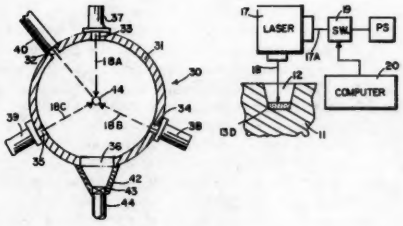
Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Continuation of Ser. No. 302,644, Sep. 15, 1981, abandoned, which is a continuation-in-part of Ser. No. 110,477, Jan. 8, 1980, abandoned, which is a continuation of Ser. No. 815,692, Jul. 14, 1977, abandoned, which is a continuation of Ser. No. 547,733, Feb. 6, 1975, which is a continuation-in-part of Ser. No. 93,779, Nov. 30, 1970, Pat. No. 4,207,154, said Ser. No. 302,644, is a continuation-in-part of Ser. No. 74,388, Sep. 10, 1979, Pat. No. 4,385,880, Ser. No. 958,514, Nov. 7, 1978, abandoned, and Ser. No. 165,445, Jul. 26, 1971, which is a continuation of Ser. No. 710,517, Mar. 5, 1970, which is a continuation of Ser. No. 501,695, Oct. 22, 1965. This application Jun. 28, 1984, Ser. No. 625,197
Int. Cl.[4] B01J *3/06;* G21B *1/00*
U.S. Cl. 423—446 18 Claims

1. A method of changing the structure of a solid material comprising:

disposing a quantity of a first reaction material in a solid state, which first material has a first crystalline structure, at a first location in a reaction chamber, and

generating and directing at least one collimated high energy radiant energy beam along an axis which intersects said first location within said reaction chamber and is directed against said reaction material disposed at said first location; causing said high energy radiant energy beam to transfer a substantial portion of its radiant energy to said reaction material and to generate a shock wave in said reaction material wherein the energy transferred to said reaction material includes the energy of said shock wave which reacts on and heats said reaction material and converts at least a portion thereof from said first crystalline state to a second state having a crystalline structure which is substantially different from said first crystalline structure of said reaction material.



4,874,598

PROCESS FOR PRODUCING PEROVSKITE-TYPE OXIDES OF THE ABO_3 TYPE

Kyoko Oda; Kunimasa Takahasi, both of Mie, and Iwao Seo, Ibaraki, all of Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Jan. 15, 1988, Ser. No. 144,172
Claims priority, application Japan, Jan. 20, 1987, 62-9080; Feb. 27, 1987, 62-44970; Feb. 27, 1987, 62-44971
Int. Cl.[4] C01G *23/00, 25/00*
U.S. Cl. 423—598 10 Claims

1. A process for producing a ABO_3 perovskite oxide where A is at least one element selected from the group consisting of Pb, Ca, Sr, and La; and B is at least one element selected from the group consisting of Ti and Zr which comprises allowing an acidic aqueous solution containing A and B ions in amounts corresponding to their proportions in said perovskite oxide to have contact with oxalic acid in the presence of at least one alcohol selected from the group consisting of ethanol, propanol, butanol, pentanol and hexanol, to effect formation of a precipitate of oxalic acid salts that serves as a precursor of said oxide, and subsequently calcining said precursor precipitate to effect formation of said perovskite oxide, wherein the oxalic acid that is contacted by said acidic aqueous solution is in an amount that is equal to the sum of 0.98 to 1.02 moles per mole of at least one B element in said acidic aqueous solution and acid radicals present in the solution containing said precursor precipitate are neutralized with ammonia or an amine.

4,874,599

MAGNESIUM FLUORIDE RECOVERY METHOD

Richard L. Gay, Canoga Park, and Donald E. McKenzie, Woodland Hills, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 14, 1985, Ser. No. 798,080
Int. Cl.[4] C01F *5/28*
U.S. Cl. 423—490 14 Claims

1. A method of obtaining magnesium fluoride substantially

free from radioactive uranium from a slag formed in the production of metallic uranium by the reduction of depleted uranium tetrafluoride with metallic magnesium in a retort wherein the slag contains the free metals magnesium and uranium and also oxides and fluorides of said metals, said slag having a radioactivity level of at least about 7,000 pCi/gm, which method comprises the sequential steps of:

(a) grinding said slag to a median particle size of about 200 microns;

(b) contacting said ground slag in a reaction zone with an acid having a strength of from about 0.5 to 1.5 N for a time of from about 4 to about 20 hours in the presence of a catalytic amount of iron, said reaction zone being maintained at a temperature within the range of from about 60° to 90° C. and the weight of ratio of slag to acid being within the range of from about 1:2 to 1:6 to produce a liquid product and a particulate solid product;

(c) removing the liquid product from step (b);

(d) treating the particulate solid product from step (c) in accordance with step (b); and

(e) repeating steps (c) and (d) at least one more time to produce a solid residue consisting essentially of magnesium fluoride substantially free of uranium and having a residual radioactivity level of less than about 1000 pCi/gm.

4,874,600

NO-CARRIER-ADDED [^{11}C]PUTRESCINE

Daniel W. McPherson, Baltimore, Md.; Joanna S. Fowler, Bellport, and Alfred P. Wolf, Setauket, both of N.Y., assignors to The United States of America as Represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 17, 1986, Ser. No. 853,105

Int. Cl.^{4} A61K *49/02*; C07C *87/14*

U.S. Cl. 424—1.1 **3 Claims**

1. A method of imaging brain tumors which comprises injecting a radiologically tolerable dose of no-carrier-added [1-^{11}C]putrescine having a radiochemical purity of at least 95% and a specific activity greater than 1.4 curies per micromole and then taking an image of the brain area with positron emission tomography.

4,874,601

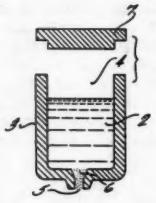
RADIOLABELLING KIT

Richard J. Flanagan, Hudson, Canada, assignor to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 16,030, Apr. 17, 1987, abandoned, which is a continuation of Ser. No. 718,766, Apr. 1, 1985, abandoned. This application Jun. 14, 1988, Ser. No. 206,452

Int. Cl.^{4} A61K *49/02*; B65D *69/00*

U.S. Cl. 424—1.1 **8 Claims**



1. A kit for direct preparation of radio-labeled compounds of the formula R-Z which comprises

(a) a vessel component containing a

Resin-S-Hg-R (A)

ingredient and a halogen-containing oxidizing agent wherein R is an organic group, and

(b) a source of MZ*, wherein M is an alkali metal and Z* is a halogen isotope.

4,874,602

REDUCTION OF THE SEVERITY 3'-AZIDO-3'-DEOXYTHYMIDINE-INDUCED ANEMIA USING BENZYLACYCLOURIDINE

Paul Calabresi, 27 Glen Ave., Barrington, R.I. 02806; Michael C. Wiemann, 11 Villa Ave., Providence, R.I. 02906, and Ming Y. W. Chu, Four Azalea Ct., Barrington, R.I. 02806

Filed Feb. 22, 1988, Ser. No. 158,463

Int. Cl.^{4} A61K *31/70, 31/505*

U.S. Cl. 424—10 **5 Claims**

1. A method of reducing anemia caused by the administration of 3'-azido-3'-deoxythymidine to an animal which comprises administering to said animal an effective anemia-inhibiting amount of 5-benzylacyclouridine.

4,874,603

USE OF VITAMIN E FOR NORMALIZATION OF BLOOD COAGULATION DURING THERAPY WITH HIGH UNSATURATED FATTY ACIDS OF OMEGA-3 TYPE

Uwe Fratzer, Lauberweg 29, D-6719 Hettenleidelheim, BRD, Fed. Rep. of Germany

Filed Mar. 15, 1988, Ser. No. 168,155

Claims priority, application Fed. Rep. of Germany, Jun. 6, 1987, 3719097

Int. Cl.^{4} A61K *31/355, 31/20*

U.S. Cl. 424—10 **4 Claims**

1. A method for normalization of blood coagulation during intake of a high omega-3 fatty acid, by increasing prothrombin time in a person taking said fatty acid, comprising the step of combining oral administration to said person of said fatty acid with oral administration of vitamin E to said person, wherein said vitamin E is administered in an amount ranging from about 40% to 100% by weight of said amount of fatty acid.

4,874,604

HAIRSPRAY WITH IMPROVED ADHESION/REMOVABILITY UPON WASHING

John A. Sramek, Racine, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.

Filed Jun. 23, 1988, Ser. No. 213,566

Int. Cl.^{4} A61L *7/11*

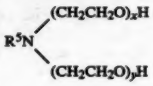
U.S. Cl. 424—47 **23 Claims**

1. A hair setting composition having improved adhesion to the hair and removability from the hair upon washing comprising from 0.5% to 8% by weight of a hair setting resin containing pendant carboxyl radicals and a solvent for the resin wherein from about 10 to 100% of the carboxyl radicals are neutralized with a neutralizing agent consisting of

(a) up to 40 mole percent, based on the mole percent of the carboxyl radicals to be neutralized, of at least one long chain amine selected from the group consisting of

$$R^1CONHR^2NR^3R^4$$

where R^1 is a hydrocarbon radical having from about 9 to 14 carbon atoms, R^2 is an alkylene radical of 2 to 4 carbon atoms, and each of R^3 and R^4 are alkyl radicals of 1 to 2 carbon atoms or hydrogen,



where R^5 is a hydrocarbon radical having from 10 to 18 carbon

atoms and the sum of x+y has an average value of from about 5 to 25, and

$$R^6OR^7NR^8R^9$$

where R^6 is a hydrocarbon radical of from 8 to 16 carbon atoms, R^7 is an alkyl radical of 1 to 2 carbon atoms, and each of R^8 and R^9 are alkyl radicals of 1 to 2 carbon atoms or hydrogen; and

(b) the balance of the neutralizing agent being a water soluble, cosmetically acceptable basic compound, said hair setting resin being a polymer of an acid selected from the group consisting of acrylic acid, methacrylic acid, crotonic acid and maleic anhydride and at least one monomer selected from the group consisting of monoesters and amides of an acid selected from the group consisting of acrylic acid and methacrylic acid, vinyl acetate and methyl vinyl ether.

(b) the balance of the neutralizing agent being a water soluble, cosmetically acceptable basic compound.

4,874,605

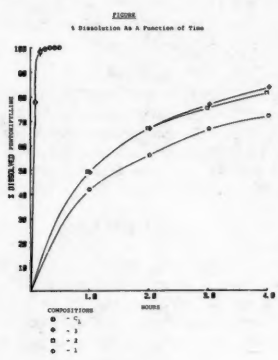
STABILIZED DELAYED RELEASE EMULSION

Joseph J. Urban, Jr., Richboro, Pa.; Norman Henderson, Gladstone, N.J., and Anthony J. Behe, Harleysville, Pa., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Filed Nov. 27, 1987, Ser. No. 125,673

Int. Cl.[4] A61K *31/74*

U.S. Cl. 424—78 10 Claims



1. An emulsion comprising:

(a) a lipophilic external phase,

(b) a hydrophilic internal phase having incorporated therein:

(i) pentoxifylline, said pentoxifylline being substantially insoluble in the lipophilic external phase; and

(ii) a gelling agent.

4,874,606

RAPID REHYDRATING BEVERAGE

Peter C. Boyle, Princeton, N.J.; Daniel G. Steffen, East Windsor, N.J.; John L. Melton, Bordentown, N.J.; Gus D. Coccodrilli, Jr., Yorktown Heights, N.Y., and Michael A. Nagy, Hightstown, N.J., assignors to General Foods Corp., White Plains, N.Y.

Continuation-in-part of Ser. No. 677,937, Dec. 14, 1984, abandoned. This application Jul. 23, 1986, Ser. No. 889,047

Int. Cl.[4] A23L *2/00*

U.S. Cl. 426—74 10 Claims

1. A flavored and sweetened aqueous beverage comprising:

(a) water in an amount of at least 94.0% by weight;

(b) sodium salt in an amount sufficient to provide about 0.025 to 0.042% by weight Na;

(c) chloride salt in an amount sufficient to provide about 0.025 to 0.54% by weight chloride;

(d) citric acid and/or citrate salts in an amount effective to provide about 0.05 to 0.15% by weight citric acid; and

(e) about 0.02 to 0.06% by weight L-aspartyl-L-phenyl-alanine methyl ester.

4,874,607

SLOW RELEASE BERLEY

Peter C. Hodgson, 27 Eighth Street, Weston, New South Wales 2326, Australia

Filed May 6, 1986, Ser. No. 860,075

Claims priority, application Australia, May 8, 1985, PH0470; Nov. 19, 1985, PH3474

Int. Cl.[4] A01N *25/00*

U.S. Cl. 424—84 43 Claims

1. A slow release berley composition comprising a mixture of from about 10% to about 35% by weight flour, from about 1.0% to about 20% by weight extracted fish oil, from about 30% to about 70% by weight bran, from about 5% to about 40% by weight water and from a trace to about 14% by weight of one or more water soluble alkali metal or alkaline earth metal salts or combinations thereof.

4,874,608

THERAPEUTIC METHOD FOR TREATING MALIGNANCIES

A. Arthur Gottlieb, New Orleans, La., assignor to Imreg, Inc., New Orleans, La.

Filed Apr. 27, 1987, Ser. No. 43,175

The portion of the term of this patent subsequent to Aug. 28, 2001, has been disclaimed.

Int. Cl.[4] A61K *37/02, 35/00*

U.S. Cl. 424—85.1 11 Claims

1. A method of treating mammalian solid tumors comprising administering to a mammalian subject an effective dosage amount of at least one amplifier of the immune system, where said amplifier essentially consists of at least one of the following: Beta-1.0, TG, or TGG.

4,874,609

TREATMENT OF HUMAN VIRAL INFECTIONS

Janet L. Rideout, Raleigh; David W. Barry, Chapel Hill; Sandra N. Lehrman, Durham; Martha H. St. Clair, Durham, and Phillip A. Furman, Durham, all of N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Continuation of Ser. No. 776,899, Sep. 17, 1985, Pat. No. 4,724,232. This application Feb. 8, 1988, Ser. No. 153,258

Claims priority, application United Kingdom, Mar. 16, 1985, 8506869; May 9, 1985, 8511774

Int. Cl.[4] A61K *39/00, 31/70*

U.S. Cl. 424—85.4 3 Claims

1. A method of treating a human having AIDS comprising the administration to said human an effective amount of 3'-azido-3'-deoxythymidine or a pharmaceutically acceptable salt thereof and interferon.

4,874,610

TALL OIL NEUTRALS TO PROTECT PLANTS FROM INSECTS AND THE LIKE

Michael J. Cousin, Circleville, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed Jun. 23, 1987, Ser. No. 65,434

Int. Cl.[4] A01N *65/00*

U.S. Cl. 424—196.1 8 Claims

1. A method for protecting plants from insects, mites, and similar pests which comprises the step of applying tall oil neutrals to plants in an amount effective to protect said plants from said insects, mites, and similar pests.

4,874,611

MICROENCAPSULATED ANT BAIT

Wilfred W. Wilson, Brazoria; Sotiros C. Polemenakos; J. Larry Potter, both of Lake Jackson; Donald J. Mangold, San Antonio; William W. Harlowe, San Antonio, and Herman W. Schlameus, San Antonio, all of, assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 746,896, Jun. 20, 1985, abandoned. This application Dec. 7, 1987, Ser. No. 129,503

Int. Cl.[4] A01N *25/08, 25/28;* B01J *13/02*

U.S. Cl. 424—410 11 Claims

1. A solid insecticidal bait comprising a generally spherical pellet of approximately 300 or more microns diameter having an enclosed core primarily made of a target insect attractant food, and mixed therein an insect toxicant in sufficient quantity for effective eradication, and including a surrounding polymeric water resistant shell impervious to the attractant food, said shell formed of poly(vinyl alcohol) or type B gelatin mixed with an attractant protein and gelling agent and wherein the core is up to about 70% by weight of the bait.

4,874,612

MULTI-COMPONENT LONG-ACTING MEDICAMENT FORMULATION FOR IMPLANTATION

Patrick B. Deasy, Dublin, Ireland, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 3, 1988, Ser. No. 152,004

Claims priority, application Fed. Rep. of Germany, Feb. 12, 1987, 3704275; Mar. 27, 1987, 3710175

Int. Cl.[4] A61K *9/22*

U.S. Cl. 424—425 18 Claims

1. A multi-component long-acting implant which contains at least two shaped pieces containing active compound, wherein these shaped pieces contain biologically degradable copolymers of lactic acid and glycolic acid with a ratio by weight of lactide to glycolide of 90:10 to 60:40, and wherein there are at least two types of shaped pieces, A and B, type A containing copolymers with a content olactide which is 5 to 15% by weight lower than in type B.

4,874,613

TASTE CONCEALING PHARMACEUTICAL DOSAGE UNIT

Charles Hsiao, Copper City, Fla., assignor to Baker Cummins Pharmaceuticals, Inc., Miami, Fla.

Continuation-in-part of Ser. No. 23,035, Mar. 6, 1987, abandoned. This application Oct. 5, 1988, Ser. No. 253,704

Int. Cl.[4] A61K *9/54*

U.S. Cl. 424—458 15 Claims

1. A pharmaceutical dosage unit comprising a plurality of subdosage units disposed within a container, each of said subdosage units being a pellet having an average diameter not greater than about 1 mm and including:

(a) an inner core particle coated with an orally active pharmaceutical agent;

(b) a first layer surrounding said core consisting of an inert clay or water-soluble polymer; and

(c) a second layer surrounding said first layer comprising a mixture of from about 10% to about 90% by weight of a cationic copolymeric acrylate resin, and from about 10% to about 90% by weight of a basic compound selected from the group consisting of calcium carbonate, aluminum hydroxide and magnesium carbonate.

4,874,614

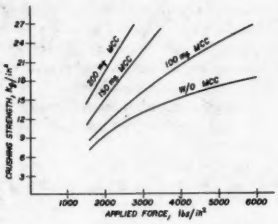
PHARMACEUTICAL TABLETING METHOD

Wallace E. Becker, Raymond, Wis., assignor to Abbott Laboratories, Abbott Park, Ill.

Continuation of Ser. No. 75,260, Jul. 16, 1987, abandoned, which is a continuation of Ser. No. 715,693, Mar. 25, 1985, abandoned. This application Jan. 30, 1989, Ser. No. 303,008

Int. Cl.[4] A61K *9/20, 9/26, 31/18, 31/71*

U.S. Cl. 424—465 5 Claims



1. In an improved method of making a pharmaceutical tablet comprised of a tablet matrix of friable enteric or controlled release coated fracturable granules and the tablet having a hardness sufficient to resist an applied fracturing pressure of at least 15kg/in^2, the improvement comprising: incorporating into the matrix prior to applying at least said fracturing pressure, microcrystalline cellulose in the amount of from about 10% to about 50%, by weight of the total matrix.

4,874,615

PROCESS FOR PREPARING WINE

Ulrich Gruenhoff, and Bernhard Schneider, both of Bad Hoenningen, Fed. Rep. of Germany, assignors to Kohlensaeurewerk Deutschland GmbH, Bad Hoenningen, Fed. Rep. of Germany

Filed Mar. 15, 1988, Ser. No. 168,442

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1987, 3708465

Int. Cl.[4] C12G *1/02*

U.S. Cl. 426—15 10 Claims

1. A process of preparing wine comprising the steps of adding carbon dioxide to grape material and converting the grape material into a mash comprising crushed grape material in the presence of the added carbon dioxide, collecting initially formed must from the mash, and fermenting the must.

4,874,616

METHOD FOR PRODUCING MUCOID AND PHAGE RESISTANT GROUP N STREPTOCOCCUS STRAINS FROM NON-MUCOID AND PHAGE SENSITIVE PARENT STRAINS

Ebenezer R. Vedamuthu, Bradenton, Fla., assignor to Microlife Technics, Inc., Sarasota, Fla.

Division of Ser. No. 786,631, Oct. 11, 1985. This application Apr. 29, 1988, Ser. No. 188,469

Int. Cl.[4] A23C *9/12, 19/00;* C12N *15/00*

U.S. Cl. 426—43 3 Claims

1. A method of increasing the thickness of milk products without addition of stabilizers which comprises:

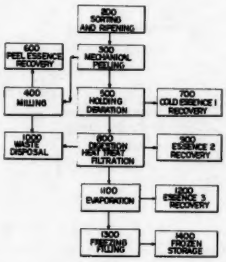
(a) providing in a milk containing product a *Streptococcus lactis* or *Streptococcus lactis* subspecies *diacetylactis* transconjugant harboring plasmid containing DNA isolated from an 18.5 Mdal parental plasmid referred to as PSRQ 2202 which encodes for production of a mucoid substance from *Streptococcus cremoris* (MS) NRRL-B-15995; and

(b) incubating the milk containing product with the *Streptococcus lactis* or *Streptococcus lactis* subspecies *diacetylactis* transconjugant to develop a mucoid substance and to increases the thickness of the milk containing product.

4,874,617
BANANA PROCESSING

Pedro Sole, Suffern, N.Y., assignor to United Brands Company, New York, N.Y.

Filed Dec. 4, 1987, Ser. No. 128,633
Int. Cl.[4] A23L 2/02
U.S. Cl. 426—49 14 Claims



1. A process for obtaining banana juice from a banana, said process comprising

providing whole, ripe bananas, each said banana comprising a peel about a pulp, said peel comprising an outer epidermis, a chloroenchyma, and a peel parenchyma;

placing a quantity of said bananas into a mechanical peeling device;

within said mechanical peeling device, separating banana pulp and peel parenchyma from the other epidermis and the chlorenchyma of banana peels;

digesting said pulp and peel parenchyma with an enzyme to cause said pulp and peel parenchyma to evolve into a solid portion and a liquid portion, said liquid portion comprising said banana juice;

separating said liquid portion from said solid portion; and

removing by vacuum deaeration and evaporation from said liquid portion volatile components comprising a banana essence and water, thereby concentrating said liquid portion, said concentrated liquid portion comprising concentrated, de-flavored banana juice.

4,874,618
PACKAGE CONTAINING A MOISTURE RESISTANT EDIBLE INTERNAL BARRIER

Jonathan Seaborne, Corcoran, and David C. Egbert, Plymouth, both of Minn., assignors to General Mills, Inc., Minneapolis, Minn.

Continuation of Ser. No. 813,889, Dec. 27, 1985, abandoned. This application Nov. 3, 1987, Ser. No. 117,442
The portion of the term of this patent subsequent to Apr. 28, 2004, has been disclaimed.
Int. Cl.[4] A21D 15/08; A23C 19/14; A23G 3/00; B65D 81/34, 25/08
U.S. Cl. 426—76 29 Claims

1. A packaged food article for food having two dissimilar phases which exhibits greater storage stability due to reduced migration between the phases, comprising:

A. a container having, vertically arranged, a first lower compartment and a second upper compartment;

B. an interjacent edible barrier, said barrier spaced within the container defining the bottom of the upper compartment and the top of the lower compartment and having opposed upper and lower major surfaces and wherein the edible barrier is laminated and includes:

1. an edible, smooth surfaced, planar substrate having an opposed pair of major surfaces thereby defining an upper major surface and a lower major surface;

2. a first layer overlaying or underlying said substrate in the form of an edible, continuous, flexible, non-water swelling, low-water vapor permeable film and comprises a member selected from the group consisting of

(a) a composition comprising the heat cured reaction polymer product of

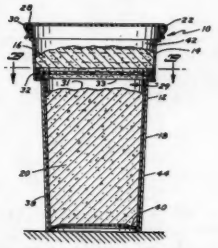
(1) unbleached, dewaxed, filtered, carbon black decolorized, virgin, edible shellac, and

(2) a first reactant member selected from the group consisting of hydroxypropyl cellulose, hydroxypropyl methyl cellulose, and mixtures thereof,

wherein the ratio of the reactant member and shellac ranges from 0.001 to 2:1,

and wherein the product has an average molecular weight of at least 2,000, and

(b) a composition comprising the heat cured reaction polymer product of unbleached, dewaxed, filtered,



carbon black decolorized, virgin, edible shellac and wherein the product has an average molecular weight ranging from about 1,500 to 6,000, and

(c) mixtures of composition (a) and composition (b);

C. means for securably positioning the barrier within the container including an internal shoulder intermediate the upper and lower compartments;

D. a first food phase having a first water activity in the lower compartment having a top surface;

E. a second food phase having a second water activity differing from the first water activity in the upper compartment; and

F. an insulative air space intermediate the lower major surface of the barrier and the top surface on the first food phase and wherein the first layer is intermediate the substrate and the food phase having the higher water activity.

4,874,619
METHOD FOR BLACK DYEING PASTA FOODSTUFFS, AND FOODSTUFFS OBTAINED BY SAID METHOD

Covi Leonardo, via Umbria 2; Bacialli Giorgio, Via Lamponi, 12, and Degli E. Raffaele, Via Venturoli, 65, all of Bologna, Italy

Filed Jul. 20, 1988, Ser. No. 221,996
Claims priority, application Italy, Jul. 20, 1987, 3561 A/87
Int. Cl.[4] H23L 1/16, 1/275; H21D 2/36
U.S. Cl. 426—94 7 Claims

1. A method of making black pasta which comprises the steps of:

(a) forming a pasta dough;

(b) incorporating into said pasta dough a quantity of powdered walnut hull and a quantity of freeze-dried spinach sufficient to impart to said dough a black coloration upon treatment with steam;

(c) shaping the dough to which the powdered walnut hull and freeze-dried spinach have been added to form a pasta product;

(d) treating said product with steam to impart a black coloration to said pasta product; and

(e) packaging the pasta product subsequent to the treatment thereof with steam to form said black coloration.

4,874,620

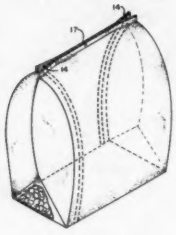
MICROWAVABLE PACKAGE INCORPORATING CONTROLLED VENTING

Abraham H. Mendenhall, Morris County, N.J.; Joseph F. Irace, and Joseph Skudrzyk, both of St. Louis County, Mo., assignors to Packaging Concepts, Inc., St. Louis, Mo.

Continuation of Ser. No. 913,964, Oct. 1, 1986, abandoned. This application Sep. 15, 1988, Ser. No. 244,279

Int. Cl.[4] B65D *30/26, 33/01, 81/34*

U.S. Cl. 426—113 **1 Claim**



1. A ventable, sealed package containing food to be microwave heated for consumption, said package being capable of allowing said food to be heated in a microwave oven while in said package, said package comprising a bag, said bag comprising a series of walls comprising longitudinally oriented front, back and inwardly folded gusseted side panels, and a bottom panel providing lower closure for the package, and a top sealed edge sealing upper portions of said front and back panels and gusseted side panels together to seal said food between the panels which food is contained therein, said bag and thus each of said panels being formed from the same continuous blank and comprising a laminated sheet comprising a heat sealable and non-wicking innermost layer, an imperforate moisture barrier intermediate layer and an imperforate outer layer, said innermost heat sealable layer having at least one array of a plurality of slits through its thickness, said slits oriented relative to each other longitudinally along the bag between the bottom panel and the top sealed edge at at least one location in at least one of said longitudinally oriented panels, said innermost layer and intermediate layer being laminated to each other over substantially the whole area of each of said longitudinally oriented panels and said bottom panel except in at least one narrow unlaminated area relative to the area of said longitudinally oriented panels which narrow area overlies the array of slits, there being one narrow area for each array of slits, said array of slits forming vent passages allowing gaseous communication from inside said bag to said unlaminated area between said innermost and intermediate layers, said unlaminated area extending longitudinally to said top sealed edge such that said unlaminated area forms at least one vertical channel which opens exteriorly of the bag at the top sealed edge allowing gaseous communication from said vent channel to the exterior of the bag, said top sealed edge comprising opposing portions of said innermost layers of said vertically oriented panels being sealed together to completely seal access to the interior of the bag from the exterior at the top, said at least one array of vent passage slits and said at least one channel between said innermost and intermediate layers dimensioned such that controlled venting of said bag occurs during microwave heating with any internally generated pressure and steam passing through said vent passages into said at least one vent channel between said innermost and intermediate layers and out through said bag at the top sealed edge with said top sealed edge between said opposed sealed innermost layers remaining completely closed.

4,874,621

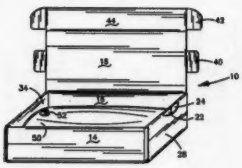
PACKAGING METHOD AND SYSTEM FOR EDIBLE SOLID FATS AND THE LIKE

Thomas D. Loughrin, Medina, Ohio, assignor to Durkee Industrial Foods Corporation, Cleveland, Ohio

Filed Feb. 4, 1987, Ser. No. 10,617

Int. Cl.[4] B65B *3/17;* **B65D** *77/06, 85/74*

U.S. Cl. 426—124 **13 Claims**



1. A method of packaging a hard fat or hard fat containing product which is normally solid at room temperature comprising the steps of:

heating said product to a molten state;

positioning a rectangular air and moisture impermeable bag having opposed broad sides horizontally on one of its broad sides, said bag comprising flexible multiple plies with one of said plies being metallized and having a fill nozzle on its broad side opposite said one broad side;

at least two opposed edges of said bag being sealed to completely seal said product;

filling said bag while in said horizontal position through said fill nozzle with said product, either while fully molten or partially cooled, but still plastic, to at least a substantially full state and closing said fill nozzle so that said bag adopts a pillow or pillow-like configuration;

placing said bag substantially horizontally in a shipping container on said one broad side, either before filling or after filling, but if after filling, before said product is hardened;

said shipping container having side and end walls confining said bag edges and dimensioned to securely hold said pillow or pillow-like configuration; and

allowing said product to cool and solidify while so confined in said container with said bag lying substantially horizontally on said one broad side.

4,874,622

SPICE-ODOR ANTIMYCOTIC CONTAINING CELLULOSIC CASING ARTICLE

Dennis A. Gaynor, Woodridge, and James R. Hansen, Tinley Park, both of Ill., assignors to Viskase Corporation, Chicago, Ill.

Filed Jul. 1, 1987, Ser. No. 68,301

Int. Cl.[4] A22C *13/00*

U.S. Cl. 426—135 **12 Claims**

1. A moisturized cellulosic casing article with water activity of at least 0.80 and having in the casing wall a spice-derived natural or synthetic equivalent antimycotic compound, imparting a food-related odor to the casing, at a concentration below about 0.2 percent based on the total casing article weight, the antimycotic compound comprising a benzene ring containing at least one phenolic hydroxyl group with at least two hydrogen substitutions (F) wherein F is a member selected from the group consisting of alkoxy, alkyl and acyl groups and wherein at least one of the F members is either an acyl group of comprises at least two carbon atoms.

4,874,623

METHOD FOR MAKING A COEXTRUDED MEAT PRODUCT

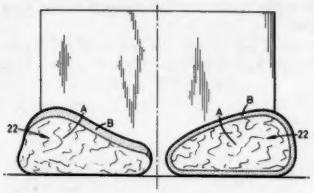
Bernard T. Matthews, Norwich; David J. Joll, Holt, and Habeeb M. Ziauddin, Norwich, all of England, assignors to Bernard Matthews plc, England

Continuation of Ser. No. 8,332, Jan. 29, 1987, abandoned. This application Jan. 5, 1989, Ser. No. 293,810

Claims priority, application United Kingdom, Mar. 21, 1986, 8607103

Int. Cl.[4] A23L *1/31;* A23P *1/12*

U.S. Cl. 426—272 4 Claims



1. A method of manufacturing a meat product comprising a lean meat core and a fatty outer layer, comprising the steps of:

(a) forming thin cold slices of lean whole-muscle meat;

(b) agitating said thin cold slices in admixture with a fluid adhesive based on lean meat for a short period sufficient to coat the slices with adhesive but neither to cause significant discharge of protein from the slices nor to compact the slices into a mass;

(c) loading the slices into hoppers and thereafter pumping the slices to and through one section of an extrusion head to thereby compact and restructure the slices into a non-oriented simulation of lean whole-muscle meat;

(d) pumping a fatty substance to and through another section of the extrusion head so that a coextrudate of non-oriented meat and fat emerges;

(e) conveying the coextrudate through an elongate freezer to case harden the coextrudate into a partially frozen log; and

(f) cutting the log into relatively short lengths.

4,874,624

PROCESS FOR MANUFACTURING A RECONSTITUTABLE CEREAL

Francis Conroy, Thurles; John Flahavan, and Edward Flahavan, both of Kilmacthomas, all of Ireland, assignors to Food and Cereal Research Limited, Waterford, Ireland

Filed Sep. 9, 1988, Ser. No. 242,680

Claims priority, application Ireland, Sep. 9, 1987, 2407/87

Int. Cl.[4] A23L *1/168*

U.S. Cl. 426—457 14 Claims

1. A process for manufacturing a reconstitutable oat cereal comprising the steps of:

de-husking, cleaning and enzyme inactivating raw oats;

forming the de-husked, cleaned and enzyme inactivated oats into flakes having a moisture content of between 8% and 16% by weight;

conditioning the oats with water until the oats have a moisture content of between 16% and 23% by weight;

cooking the conditioned oats in an extruder cooker at a residence time of from 10 seconds to 120 seconds and at a pressure at the die face of the cooker sufficient to plasticise and cook the oats;

discharging exudate from the extruder cooker;

flaking the exudate; and

drying the flaked exudate to a moisture content of between 2% and 12% by weight.

4,874,625

FLAVORING MATERIAL POSSESSING FERMENTED SOY SAUCE CHARACTERISTICS

Guy J. Hartman, Decatur, Ill., assignor to A. E. Staley Manufacturing Company, Decatur, Ill.

Filed Aug. 12, 1987, Ser. No. 84,598

Int. Cl.[4] A23L *1/22*

U.S. Cl. 426—533 2 Claims

1. A process of preparing an edible material useful as a flavoring consisting essentially of:

(a) first mixing a protein hydrolysate with an aqueous reducing sugar source, said aqueous reducing sugar source being substantially free of ethanol, to form an aqueous mixture;

(b) mixing said aqueous mixture with an amount of ethanol sufficient to form a slurry wherein the liquid medium of said slurry is comprised of a major amount of weight of ethanol and a minor amount by weight of water; and

(c) heating the slurry at a temperature and for a time sufficient to increase the absorption by said mixture of visible radiation to provide a flavoring having flavor notes characteristics of fermented soy sauce without the need for resort to fermentation.

4,874,626

EDIBLE PLASTIC PRODUCT

Wilhelmus A. M. Castenmiller, Vlaardingen; Allan K. Chesters, and Peter B. Ernsting, both of Delft, all of Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Filed Mar. 16, 1988, Ser. No. 168,828

Claims priority, application United Kingdom, Mar. 20, 1987, 8706711

Int. Cl.[4] A23D *3/00*

U.S. Cl. 426—564 8 Claims

1. Edible plastified product comprising a continuous fat phase, 0.5–30 volume % of a dispersed gas phase present as gas bubbles with means diameter of 1 to 100 microns, and 0.5 to 65% of a dispersed aqueous phase, where the dispersed gas phase comprises 10 to 100 vol. % helium.

4,874,627

NON-FAT DAIRY COMPOSITIONS

Donald G. Greig, Petaluma, and Edward L. Bonneau, III, Mill Valley, both of Calif., assignors to Nouvelle Ice Cream Corporation, San Rafael, Calif.

Filed Jun. 14, 1988, Ser. No. 206,616

Int. Cl.[4] A23G *3/32, 3/30, 9/02*

U.S. Cl. 426—565 15 Claims

1. A caramelized non-fat dairy dessert composition having a total solids range of from about 9 percent to about 98 percent, said composition consisting essentially of: (a) non-fat milk, 0–100 percent; (b) milk solids non-fat, 0–100 percent; (c) sweetener, 0–80 percent; (d) liquid selected from the group consisting of water and fruit juice, 0–91 percent; and (e) stabilizer, 0–2.5 percent; wherein said percents are percents by weight based upon the total weight of said composition; and wherein the compositions contain at least 0.5 percent MSNF, and wherein at least a portion of the milk solids in the MSNF are caramelized milk solids.

4,874,628

PROCESS FOR THE MANUFACTURE OF CAST JELLY GUM CONFECTIONARIES

James L. Eden, East Millstone; James J. Kasica, Somerville, and James P. Zallie, Bound Brook, all of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Sep. 12, 1988, Ser. No. 242,852

Int. Cl.[4] A23G *6/00*

U.S. Cl. 426—578 19 Claims

1. A process for the manufacture of a jelly gum confectionary by casting, which comprises the steps of:

(a) preparing a dispersion of about 1 to 15%, on a dry solids

basis, of a pregelatinized high amylose starch having an amylose content of at least about 40% amylose or a combination thereof with up to about 9 parts of a converted starch other than a high amylose starch, about 80–95% of a sweetener, and sufficient water, the percentages being by weight and totaling 100%; wherein the pregelatinized high amylose starch is selected from the group consisting of an unconverted starch, a converted starch, and mixtures thereof and wherein the pregelatinized unconverted or converted high amylose starch is selected from the group consisting of (i) a spray-dried uniformly gelatinized granular starch in the form of indented spheres, with at least a majority of the granules being whole and unbroken, the starch granules being in the form of loosely-bound agglomerates or individual granules, (ii) a spray-dried, non-granular starch, characterized in that the starch is substantially non-crystalline, substantially non-retrograded, and fully pre-dispersed, (iii) a drum-dried fully dispersed, non-granular starch which is a porous, fluffy powder, and (iv) mixtures thereof;

(b) continuously cooking the dispersion at at least 107° C. (225° F.) and less than 166° C. (330° F.) in a jet-cooker for a time sufficient to fully solubilize the starch or starches; and

(c) casting the cooked dispersion.

4,874,629

PURIFICATION OF FISH OIL

Stephen S. Chang, 29 Gloucester Ct., East Brunswick, N.J. 08816; Yongde Bao, 267 George St., New Brunswick, N.J. 08901, and Timothy J. Pelura, 3336 Solomon La., Alameda, Calif. 04501

Filed May 2, 1988, Ser. No. 189,198
Int. Cl.[4] A23D *5/00*; C11B *3/12*
U.S. Cl. 426—601 **11 Claims**

1. A process of treating an edible fish oil containing EPA and DHA consisting essentially of:

subjecting said oil to vacuum steam distillation under mild conditions for a time sufficient to reduce low temperature boiling and less polar volatile flavor compounds;

contacting said oil with an adsorbent selected from the group consisting of silica gel and silicic acid to reduce high temperature boiling and more polar volatile flavor compounds and undesirable minor constituents selected from the group consisting of polymers, cholesterol, pigments, pesticides, PCB'S, heavy metals and mixtures thereof, and

recovering the treated oil.

4,874,630

PROCESS FOR PRODUCING RETORT BEAN CURDS

Koji Sengoku, and Yoshiaki Nagatome, both of Osaka, Japan, assignors to House Food Industries, Co., Osaka, Japan

Continuation of Ser. No. 925,942, Nov. 3, 1986, abandoned. This application Apr. 6, 1989, Ser. No. 333,814
Claims priority, application Japan, Apr. 30, 1986, 61-97897
Int. Cl.[4] A23L *1/20*
U.S. Cl. 426—634 **5 Claims**

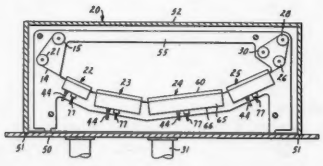
1. A process for producing retort bean curds wherein an effective amount of a solidification agent to ensure gelling is added to soybean milk or an aqueous solution of soybean protein extract, the resulting mixture is placed into a heat-resisting synthetic resin mold container and the content of said mold container is subjected to retort treatment, comprising, further adding to said soybean milk or aqueous solution of soybean protein extract polyoxyethylene sorbitan fatty acid ester of above HLB-14 and cane sugar fatty acid ester of above HLB-11 together with said solidification agent, and when the amount of said polyoxyethylene sorbitan fatty acid ester is A, and the amount of said cane sugar fatty acid ester is B, in percent by weight based on the weight of said soybean milk or aqueous solution of soybean protein extract, the polyoxyethylene sorbitan fatty acid ester and cane sugar fatty acid ester are added to said soybean milk or aqueous solution of soybean protein extract so that the sum of the amounts satisfies the formula $0.18 > A \times 2.5 + B \geqq 0.09$, and based on the weight of said soybean milk or aqueous solution of soybean protein extract, the amounts of said polyoxyethylene sorbitan fatty acid ester is between about 0.01% to about 0.032% by weight and said cane sugar fatty acid ester is between about 0.01 0.1% by weight.

4,874,631

MULTI-CHAMBER DEPOSITION SYSTEM

Richard L. Jacobson, Roseville; Frank R. Jeffrey, Shoreview, and Roger K. Westerberg, Cottage Grove, all of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 877,161, Jun. 23, 1986, abandoned. This application Feb. 16, 1988, Ser. No. 157,238
Int. Cl.[4] C23C *16/00*
U.S. Cl. 427—39 **1 Claim**



1. A method for depositing thin coatings on a substrate comprising the steps of:

evacuating a large chamber in which has been placed a roll of web material;

advancing the web material from the supply roll through a web cleaning chamber disposed within said large evacuated chamber in the presence of a glow discharge;

advancing the web material through a deposition chamber disposed within said large evacuated chamber and depositing thereon elements in the presence of a glow discharge resulting from the introduction of process gas into said deposition chamber at a pressure above that of said large chamber;

advancing the web material through a second deposition chamber disposed within said large evacuated chamber in which is applied a second coating on the web material from elements in a process gas applied in the presence of glow discharge at a pressure above that of said large chamber;

advancing the web material through a third deposition chamber disposed within said large evacuated chamber to apply a third thin coating on the web material of an element in the presence of a glow discharge of a process gas;

rewinding the web material on a take-up roll disposed within said large chamber; and

maintaining the reduced atmosphere within said large chamber below the pressure in said deposition chambers for restricting diffusion of process gas from one deposition chamber to another deposition chamber.

4,874,632

PROCESS FOR FORMING PATTERN FILM

Yoshitomo Nakagawa; Takashi Kaito; Hisao Houjyo, and Masahiro Yamamoto, all of Tokyo, Japan, assignors to Seiko Instruments, Inc., Japan

Continuation of Ser. No. 706,478, Feb. 28, 1985, abandoned. This application Oct. 17, 1986, Ser. No. 921,820
Claims priority, application Japan, Feb. 29, 1984, 59-38131
Int. Cl.[4] B05D *3/06*
U.S. Cl. 427—41 **33 Claims**

1. A process for repairing a white-spot defect in the surface

of a photomask comprising: forming and directing a vapor stream of a polymerizable or carbonizable organic compound onto a surface of a photomask at the region of a white-spot defect; and irradiating the surface of the photomask in the

region of the white-spot defect with an ion beam effective to selectively polymerize or carbonize the organic compound at the photomask surface in the region of the white-spot defect to thereby repair the white-spot defect.

4,874,633

METHOD OF PRODUCING MAGNETIC RECORDING MEDIUM

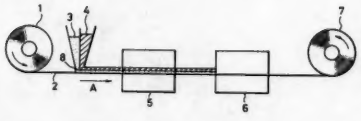
Kazunori Komatsu; Hiroshi Chikamasa, and Tsunehiko Sato, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 17, 1986, Ser. No. 919,941

Claims priority, application Japan, Oct. 18, 1985, 60-231097

Int. Cl.[4] H01F *10/02*

U.S. Cl. 427—48 **2 Claims**



1. In a method for producing a magnetic recording medium by forming a magnetic layer by the steps of applying a magnetic film forming liquid onto a continuously running non-magnetic support, applying a magnetic field onto the magnetic film forming liquid before the magnetic film forming liquid has dried, and then drying the magnetic film forming liquid, the improvement comprising: forming a non-magnetic undercoating layer on the support simultaneously with forming the magnetic layer by simultaneously applying to the support a non-magnetic undercoating forming liquid and the magnetic film forming liquid, and applying the magnetic field before both the magnetic film forming liquid and non-magnetic undercoating forming liquid have dried, and wherein the magnetic layer is formed with a thickness of no more than 2 microns.

4,874,634

VAPOR PHASE DEPOSITION OF CADMIUM AND MERCURY TELLURIDE FOR ELECTRONIC DEVICE MANUFACTURE

Brian C. Easton, Reigate, and Peter A. C. Whiffin, Horsham, both of England, assignors to U.S. Philips Corp., New York, N.Y.

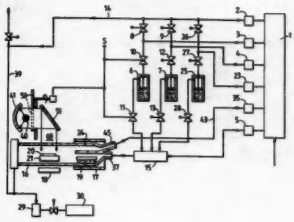
Filed Apr. 14, 1988, Ser. No. 181,280

Claims priority, application United Kingdom, Apr. 16, 1987, 8709185

Int. Cl.[4] B05D *3/06*

U.S. Cl. 427—54.1 **9 Claims**

1. In the manufacture of an electronic device, a method of depositing alternate layers of cadmium telluride and mercury telluride on a substrate in a reaction zone inside a reactor vessel, comprising the steps of (a) passing a gas stream containing a volatile tellurium compound over the substrate while maintaining an atmosphere of mercury vapour in the reaction zone, and (b) periodically switching on and off a supply of a volatile cadmium compound to the reaction zone so as to deposit cadmium telluride when the supply is on and to deposit mercury telluride when the supply is off, the surface of the substrate being irradiated with electromagnetic radiation during the deposition, characterized by periodically switching the



intensity of the irradiation during the deposition in such manner that the irradiation intensity is reduced to reduce photodissociation of the volatile compounds when the supply of the volatile cadmium compound is switched on, and that, when said supply is switched off, the irradiation intensity is increased to promote photodissociation of the volatile tellurium compound by the electromagnetic radiation.

4,874,635

METHOD FOR REMOVING RESIDUAL PRECIOUS METAL CATALYST FROM THE SURFACE OF METAL-PLATED PLASTICS

Bradley R. Karas, Amsterdam; Donald F. Foust, Scotia, and William V. Dumas, Delanson, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 4, 1988, Ser. No. 177,254

Int. Cl.[4] H05K *3/46*

U.S. Cl. 427—96 **23 Claims**

1. A method for removing residual precious metal catalyst from a polyimide, polycarbonate, polysulfone, polyphenylene oxide, polyphenylene sulfide or polyester surface having a metal plated on at least a portion thereof, comprising oxidation of the precious metal without substantial degradation of the plated metal by a reagent which, as incorportated into an aqueous solution, has a standard potential equal to or greater than the standard potential for the half-reaction of the precious metal under a pH influence corresponding to the pH of said aqueous solution, said reagent being a permanganate salt, a hypochlorite salt, hydrogen perioxide, peroxide salt or a ceric salt, followed by washing away the oxidized precious metal.

4,874,636

METHOD FOR PREPARING MAGNETIC RECORDING MEDIUM

Tsutomu Okita; Hiromi Nakahara, and Hiroshi Ogawa, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 6, 1988, Ser. No. 253,637

Claims priority, application Japan, Oct. 6, 1987, 62-250787

Int. Cl.[4] B05D *5/12*

U.S. Cl. 427—130 **7 Claims**

1. A method for preparing a magnetic recording medium comprising the steps of: dispersing ferromagnetic particles in a binder solution; coating the resulting magnetic coating composition on a nonmagnetic support to provide a magnetic layer; drying said magnetic layer; and providing a calendering treatment with said magnetic layer, wherein said binder solution comprises at least one compound selected from the group consisting of a polyurethane resin having a tan 6 peak temperature of 30° C. or higher as a result of measuring dynamic

viscoelasticity, a cellulose acetate butyrate, a cellulose acetate propionate, and a butyral resin; and when said magnetic layer is dried until the solvent content of said magnetic layer is in the range of from 0.1 to 3 wt%, said calendering treatment is provided with said magnetic layer.

4,874,637

METHOD OF MAKING THIN FILM MAGNETIC RECORDING MEDIUM

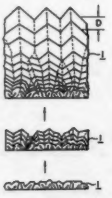
Takeshi Miyabayashi, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Division of Ser. No. 46,265, May 4, 1987. This application Oct. 24, 1988, Ser. No. 261,782

Claims priority, application Japan, Jun. 5, 1986, 61-103499

Int. Cl.[4] B05D *5/12*

U.S. Cl. 427—131 **5 Claims**



1. A method of producing a thin film magnetic recording medium comprising the step of:

dipping a substrate in an electroless plating solution for depositing a crystal of a cobalt magnetic material on said substate to form a first crystal film thereon;

adding a metallic salt solution for suppressing growth of a grain size of a crystal structure into said electroless plating solution at least once after a predetermined period of time has passed from the dipping of said substrate under the condition that said substrate is dipped in said electroless plating solution to thereby form a grain size suppression film on said first crystal film; and

forming then a second cystal film having a crystal structure of a small grain size on said grain size suppression film.

4,874,638

PROCESS FOR IMPROVING THE ADHESION OF POLYMERIC SUBSTANCES

Herbert Eck, Burghausen; Gerald Fleischmann, Emmerting; Alfred Prasse, Burghausen, and Kunigunde Kolbig, Gumpersdorf-Postann, all of Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany

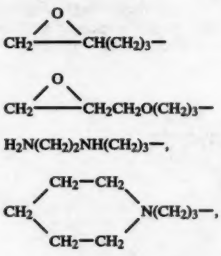
Filed Mar. 21, 1988, Ser. No. 171,050

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1987, 3711225

Int. Cl.[4] B05D *3/02, 3/10*

U.S. Cl. 427—222 **8 Claims**

1. A process for improving the adhesion of polymeric substances containing organic groups or composed of such groups to the surfaces of alkaline earth metal carbonates, which comprises applying to the alkaline earth metal carbonate surface an organic aprotic solvent solution containing at least one organosilicon compound having fluorine bonded directly to silicon and an average of not more than 1.8 SiC-bonded organic radicals per silicon atom, in which an organic group of the silicone compound is selected from the group consisting of hydrocarbon radicals having from 1 to 18 carbon atoms, halogen substituted hydrocarbon radicals, mercaptoalkyl radicals, acyloxyalkyl radicals, radicals of the formula



and cyanoalkyl radicals, and then removing the solvent before applying a polymeric substance containing organic groups to the alkaline earth metal carbonate surface.

4,874,639

COATING METHOD IN COATING LINE AND COATING APPARATUS THEREFOR

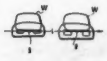
Masataka Matsui; Toshiaki Aono; Yoshio Tanimoto; Tadamitsu Nakahama, and Takakazu Yamane, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Sep. 24, 1987, Ser. No. 100,767

Claims priority, application Japan, Sep. 25, 1986, 61-226458; Mar. 26, 1987, 62-70388; Mar. 26, 1987, 62-70389; Apr. 30, 1987, 62-104426; Apr. 30, 1987, 62-104427

Int. Cl.[4] B05D *1/02*

U.S. Cl. 427—240 **46 Claims**



1. A coating method in a coating line for coating a vehicle body with a paint containing a volatilizable solvent to form a highly reflective surface coating on the body, comprising:

a spraying step in which the paint is sprayed to form a coat in a film thickness thicker than a thickness at which the paint sags on a surface extending at least upwardly and downwardly; and

a drying step comprising sequential setting and baking steps in which the body is held in an ambient temperature during the setting step which is lower than the ambient temperature during the baking step and in which the body having substantially all the applied coat thereon is rotated about its horizontal axis until the paint sprayed thereon achieves a substantially sagless state, the rotation of the body in the setting step being carried out at a speed which is high enough to rotate the body from a vertical position to a horizontal position before the paint coated thereon substantially sags due to gravity yet which is low enough so as to cause no sagging as a result of centrifugal force.

4,874,640

IMPACT ABSORBING COMPOSITES AND THEIR PRODUCTION

Byron A. Donzis, 28 E. Rivercrest Dr., Houston, Tex. 77042

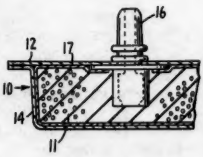
Continuation-in-part of Ser. No. 99,368, Sep. 21, 1987, abandoned. This application Jan. 7, 1988, Ser. No. 141,592

Int. Cl.[4] B05D *1/18, 1/02*

U.S. Cl. 427—421 **10 Claims**

1. A method for producing a shock-absorbing composite for absorbing and dispersing impacting forces comprising forming a flexible foam core shaped and sized as required for said shock-absorbing composite, applying to the outer surface of

said core a layer of prepolymer solution/suspension, curing the layer of prepolymer solution/suspension to yield a flexible



plastic layer thereby forming a flexible enclosure surrounding and adhered on all sides to said core, said flexible enclosure being capable of having its internal pressure changed.

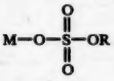
4,874,641

METHOD OF PROVIDING A BARRIER BETWEEN A SUBSTRATE AND THE ATMOSPHERE AND COMPOSITIONS THEREFOR

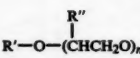
Paul A. Kittle, West Chester, Pa., assignor to Rusmar Incorporated, West Chester, Pa.

Filed Nov. 24, 1987, Ser. No. 124,890
Int. Cl.[4] B05D *5/00*; B05C *1/16*
U.S. Cl. 427—244 **11 Claims**

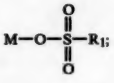
1. The method of forming a barrier layer between a substrate and the outdoor atmosphere, wherein the substrate is a material producing dust, noxious fumes, or odors or blowing trash, or a plant subject to damage from adverse atmospheric conditions, which comprises applying to the substrate an essentially biodegradable foam prepared from an aqueous composition comprising, in an approximately 1:1 molar ratio, (A) at least one anionic surface active sulfate having the formula



where —OR is an alkoxy, alkylenoxy or alkaryloxy group having from 10 to 20 carbon atoms or an alkyl polyether group



in which R' is an alkyl group containing from 10 to 20 carbon atoms, R'' is H or an alkyl group containing up to 4 carbon atoms, and n is an integer from 1 to 12, or a sulfonate having the formula



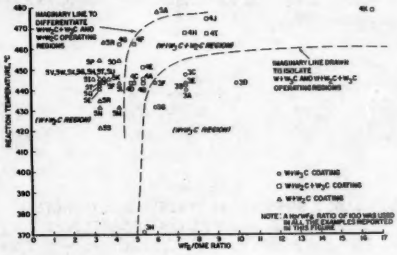
where R_1 is an alkyl, alkylene or alkaryl group containing from 10 to 20 carbon atoms, and where M is a monovalent cation, and (B) a carboxylic acid salt, R_2COOM_1, where R_2 is an alkyl group containing from 8 to 30 carbon atoms and M_1 is a monovalent cation.

4,874,642

METHOD FOR DEPOSITING A HARD, FINE-GRAINED, NON-COLUMNAR ALLOY OF TUNGSTEN AND CARBON ON A SUBSTRATE

Diwaker Garg, Macungie, Pa.; Beth A. Klucher, Sherman Oaks, Calif.; Paul N. Dyer, Allentown, Pa.; Richard W. Kidd, Newhall, Calif., and Christopher Ceccarelli, Whitehall, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Sep. 3, 1987, Ser. No. 92,809
Int. Cl.[4] C23C *16/32*
U.S. Cl. 427—249 **28 Claims**



1. A method for depositing a hard, fine-grained, non-columnar alloy of tungsten and carbon having a substantially lamellar or layered microstructure on a substrate, said alloy consisting essentially of a mixture of a tungsten phase and a carbide phase wherein said carbide phase is selected from the group consisting of (1) W_2C, (2) W_3C, and (3) a mixture of W_2C+W_3C, said method comprising the steps of: providing, in a chemical vapor deposition reactor, a mixture of process gases comprised essentially of (1) tungsten hexafluoride, (2) a volatile oxygen- and hydrogen-containing organic compound, and (3) hydrogen; controlling the ratio of said tungsten hexafluoride to said oxygen- and hydrogen-containing organic compound within said reactor so that the W/C atomic ratio is within the range of about 1 to about 6; controlling the reaction temperature so it is within the range of about 350° to about 550° C.; controlling the total pressure within the range of about 1 Torr. to about 1,000 Torr.; and controlling the ratio of H_2 to WF_6 within the range of about 4 to about 20 to produce W and W_2C, W and W_3C, or W and W_2C and W_3C.

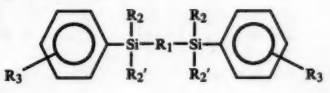
4,874,643

AROMATIC SILANE POLYMER COATINGS

Susan L. Oldham, Torrance; William E. Elias, Redondo Beach; Stephen J. Bigus, Long Beach, and Kreisler S. Y. Lau, Alhambra, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 46,013, May 5, 1987. This application Jul. 13, 1988, Ser. No. 218,177
Int. Cl.[4] B05D *3/04, 3/10*; B32B *9/04*
U.S. Cl. 427—340 **6 Claims**

1. A method for rendering a substrate resistant to erosion by a plasma comprising oxygen, comprising forming on the surface of said substrate a layer of a cured polymer of a compound having the formula



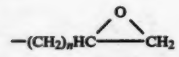
where:

R_1 is selected from the group consisting of:

(a) an aliphatic hydrocarbon group containing 2 to 10 carbon atoms, and

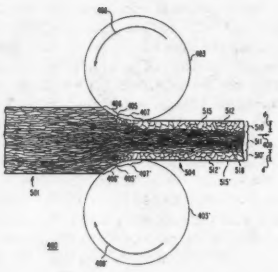
(b) a group having the formula

where n=1 to 3
m=0 to 5
R_2 and R_2' are each selected from the group consisting of an alkyl group containing 1 to 4 carbon atoms, an unsubstituted aryl group, and a substituted aryl group; and
R_3 comprises:



n=0 to 10

4,874,644
VARIABLE STRENGTH MATERIALS FORMED THROUGH RAPID DEFORMATION
Hugo S. Fergison, Averill Park, N.Y., assignor to MRE Corporation, Sand Lake, N.Y.
Continuation-in-part of Ser. No. 31,428, Mar. 27, 1987, abandoned. This application Mar. 22, 1988, Ser. No. 171,642
Int. Cl.[4] C21D *7/00, 7/02, 7/13*
U.S. Cl. 148—12 R **22 Claims**



1. A material produced from a base metal, having a structure capable of undergoing an allotropic transformation and having continuous heating upper and lower transformation temperatures, wherein the base metal was deformed at a sufficiently rapid rate to produce a rate of change in internal energy of the base metal sufficient to depress the allotropic transformation temperatures and induce an allotropic transformation to have occurred in a portion of the base metal, said material comprising, in cross-section:

a first region substantially comprised of substantially equiaxed grains and extending inward from a surface of said material to a finite depth below said surface, wherein substantially all the base metal situated in said first region attained a temperature equal to or greater than the upper transformation temperature and thereby transformed into said substantially equiaxed grains;

a second region, substantially comprised of non-transformed grains and situated within a remainder of the material, wherein substantially all the base metal situated in said second region attained a temperature less than the lower transformation temperature and thereby did not transform; and

a third region, situated between said first and second regions, substantially comprised of both substantially equiaxed and non-transformed grains, wherein the base metal situated in said third region attained a temperature greater than or equal to said lower transformation temperature and thereby experienced at least partial transformation.

4,874,645
PLASTIC STRUCTURAL MEMBER
Hiroyuki Fujiki, Fujisawa; Yoshiharu Michiura, Chigasaki, and Kiyoshi Inoue, Isehara, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama and Ichikoh Industries Limited, Tokyo, both of, Japan
Filed Apr. 28, 1987, Ser. No. 43,403
Claims priority, application Japan, Apr. 30, 1986, 61-101609
Int. Cl.[4] B60R *13/00*
U.S. Cl. 428—31 **15 Claims**

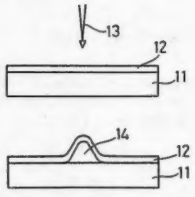
1. An automotive vehicle body plastic finisher comprising:

first and second plastic parts joined at a parting plane with each other with no gap therebetween and having respective surfaces which are planarly aligned with each other to form a common outer surface, at least one of said first and second plastic parts being coloured, said first and second plastic parts and said parting plane extending generally horizontally, said common outer surface being generally vertical;

said parting plane including a first section generally perpendicular to said outer surface; and

a second section contiguous to said first section and inclined relative to said outer surface.

4,874,646
ULTRAFINE TUBE AND METHOD FOR ITS PRODUCTION
Yoshikazu Tsujino, Sakai; Yuuji Hamada; Masakazu Sakata, both of Hirakata; Takanori Fujii, Hirakata, and Yukinori Kuwano, Katano, all of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan
Filed May 17, 1988, Ser. No. 196,170
Claims priority, application Japan, May 18, 1987, 62-120803
Int. Cl.[4] B27N *5/02*
U.S. Cl. 428—34.1 **7 Claims**



4. A method for producing ultrafine tubes according to claim 1 wherein said highly polymerized material is selected from the group consisting of polymethyl methacrylate, polymethyl isopropenyl ketone, polytrichloroethyl methacrylate, poly-α-cyanoacrylate, polyhexafluorobutyl methacrylate, poly-α-methylstyrene, polytrifluoro-α-chloroacrylate, poly-l-butene, polymethacrylate esters and derivatives thereof, and polyacrylate esters and derivatives thereof.

4,874,647

POLYESTER COMPOSITION, MOLDED POLYESTER LAMINATE AND USE THEREOF

Tadao Yatsu, and Yoshinori Akana, both of Iwakuni, Japan, assignors to Mitsui Petrochemical Industries, Inc., Tokyo, Japan

Continuation of Ser. No. 127,316, Dec. 2, 1987, abandoned. This application Nov. 28, 1988, Ser. No. 277,524

Claims priority, application Japan, Dec. 4, 1986, 61-287776; Dec. 9, 1986, 61-291489

Int. Cl.[4] B65D *1/00;* B32B *27/08, 27/36*

U.S. Cl. 428—35.7 4 Claims

1. A molded polyester laminate comprising

(I) a layer of a polyester composition comprising

(A) 20 to 80% by weight of a polyalkylene terephthalate comprising ethylene terephthalate as a main unit and having an intrinsic viscosity [η] in the range of from 0.6 to 1.2 dl/g as measured in o-chlorophenol at 25° C., and

(B) 20 to 80% by weight of a polycarbonate comprising bisphenol-A as a diol component and having an intrinsic viscosity [η] in the range of from 0.6 to 1.2 dl/g as measured in o-chlorophenol at 25° C.,

said composition having an intrinsic viscosity [η] in the range of from 0.6 to 1.2 dl/g as measured in o-chlorophenol at 25° C. and a single glass transition temperature [Tg] in the range of from 80° to 130° C., and

(II) a layer of a polyalkylene terephthalate comprising ethylene terephthalate as a main unit.

4,874,648

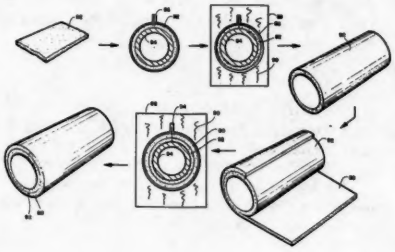
METHOD OF MAKING FLAME RESISTANT POLYIMIDE FOAM INSULATION AND THE RESULTING INSULATION

Francis V. Hill, and Lola E. Crosswhite, both of San Diego, Calif., assignors to Sorrento Engineer, Inc., National City, Calif.

Filed Mar. 17, 1988, Ser. No. 167,796

Int. Cl.[4] B32B *1/08, 1/10*

U.S. Cl. 428—35.9 19 Claims



14. The method of making a rigid tubular duct having high insulation efficiency and a highly flame resistant outer surface which comprises the steps of:

providing an uncured sheet of open cell polyimide foam uniformly impregnated with a liquid polyimide resin precursor;

wrapping said uncured sheet at least once around a collapsible mandrel;

covering said uncured sheet with a cover having an internal configuration corresponding to said mandrel shape and spaced uniformly therefrom;

heating the assembly at a temperature of from about 400° to 650° F. for a period sufficient to cure said impregnating resin;

whereby a tubular rigid foam duct is produced;

providing a substantially uniform low density sheet of polyimide foam which had been foamed unconstrained;

pressing said low density sheet between opposed surfaces to a thickness of from about 25 to 40 per cent of its original thickness;

heating said low density sheet at a temperature of from about 400° to 650° F. for a period sufficient to stabilize the foam at higher density;

applying a coating of liquid polyimide resin precursor to one surface of the stabilized foam sheet;

drying the coated surface;

wrapping said stabilized foam sheet around said rigid foam duct with the coated surface in contact with said duct;

holding said stabilized foam sheet in place;

heating the resulting assembly to a temperature of from about 400° to 650° F. for a period sufficient to cure said coating polyimide precursor; and

whereby a high efficiency rigid insulated duct having a highly flame resistant outer face is produced.

4,874,649

PROCESS FOR PRODUCING HOLLOW BODIES OF THERMOPLASTIC MATERIAL

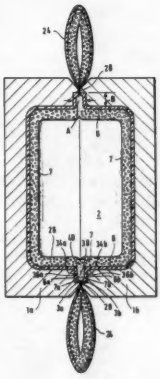
Werner Daubenbüchel, Bergisch-Gladbach, and Alfred Jira, Königswinter, both of Fed. Rep. of Germany, assignors to Krupp Kautex Maschinenbau GmbH., Fed. Rep. of Germany

Filed Feb. 10, 1988, Ser. No. 154,677

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1987, 3708006

Int. Cl.[4] B32B *5/20;* B29C *67/22, 49/22, 49/04*

U.S. Cl. 428—36.5 25 Claims



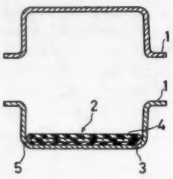
1. A hollow body of thermoplastic material produced by a co-extrusion blow molding process and comprising a wall provided by a plurality of layers of which at least one layer is at least partially foamed, wherein the hollow body which is produced from a co-extrusion preform has a welded seam for closing the hollow body at regions thereof at which excess material has been squeezed off the preform when the mold was closed, wherein said welded seam at least over part of the extent thereof is in the form of a flange portion which projects outwardly relative to the adjacent wall regions of the hollow body, and wherein the flange portion is of a thickness perpendicularly to its longitudinal extent, which is less than double the wall thickness of the preform in the foamed condition of said at least one layer of foamable material.

4,874,650

THERMOSETTING FOAMING SEALER

Osamu Kitoh, Nagoya, and Masahiko Ohashi, Inazawa, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha and Iida Industry Co., Ltd., both of, Japan

Filed Dec. 20, 1988, Ser. No. 287,295
Claims priority, application Japan, Dec. 21, 1987, 62-323480
Int. Cl.[4] B32B *3/26*
U.S. Cl. 428—68 12 Claims



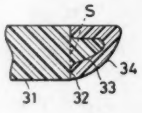
1. A thermosetting foaming sealer for filling up a vacant space comprising:
- a foaming substance having a shape substantially agreeing with a vacant space to be filled up; and
- a restraining substance for restraining said foaming substance in a compressed state; wherein
- said restraining substance is an elastomer having high viscosity at room temperature, substantially maintaining said compressed state of said compressed foaming substance, and coming to have low viscosity during paint film baking.

4,874,651

END STRUCTURE FOR SYNTHETIC RESIN MEMBER

Ryoji Takai, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jun. 22, 1987, Ser. No. 64,483
Claims priority, application Japan, Sep. 5, 1986, 61-136246[U]
Int. Cl.[4] B60R *13/04*
U.S. Cl. 428—81 6 Claims



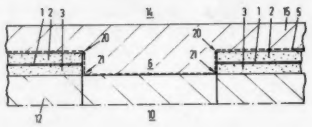
1. An end structure for a synthetic resin member, comprising:
- an end surface of said member, said end surface including a first generally central region and a second region radially surrounding said first region;
- a projection provided to protrude from the first region so as to expose an entire outer peripheral surface of said projection and said second region; and
- a portion of synthetic resin injection molded onto said member so as to completely cover said outer peripheral surface of said projection and said second region.

4,874,652

PERFORATED ROOFING MATERIAL AND A METHOD OF MANUFACTURING THE SAME

Jan Hollander, Zuidhorn, Netherlands, assignor to B.V. Asphalt-en Chemische Fabrieken Smid and Hollander, Groningen, Netherlands

Continuation of Ser. No. 880,418, Jun. 30, 1986, abandoned.
This application Jun. 29, 1988, Ser. No. 213,467
Claims priority, application Netherlands, Jul. 1, 1985, 8501890
Int. Cl.[4] B32B *3/10*
U.S. Cl. 428—137 4 Claims



1. An improved perforated roofing material, for use as a first layer in a multi-layer bituminous roofing system of the type in which fluidized bonding agent is applied on top of a perforated roofing material for covering and bonding the perforated roofing material to a roofing surface, comprising:
- a bitumenized carrier having first and second surfaces;
- a metal foil mounted to said first surface to form a metalized roofing material, the metal foil in use being positioned directly against the roofing surface;
- the metalized roofing material having perforations formed therethrough, the perforations occupying about 15%–30% of the surface area of the metalized roofing material and being about 40–80 mm across, said perforations permitting the fluidized bonding agent to pass freely through the perforations and contact and bond to the roofing surface substantially over the expanse of each of the perforations only; and
- the metal foil being chosen to dissipate heat substantially laterally such that during installation of the metalized roofing material on the roofing surface, the bonding agent does not spread substantially beyond the expanse of the perforations.

4,874,653

HIGH STRENGTH LAMINATE

Ole-Bendt Rasmussen, Forchwaldstrasse 23, CH-6318 Walchwil/Zug, Switzerland

Division of Ser. No. 915,988, Oct. 6, 1986, Pat. No. 4,767,488.
This application Jul. 7, 1988, Ser. No. 216,024
Claims priority, application Denmark, Oct. 4, 1985, 4553/85
Int. Cl.[4] B32B *3/28, 27/08, 5/12*
U.S. Cl. 428—182 8 Claims

1. A high-strength laminate comprising at least two generally weakly adhered biaxially oriented films, each formed of a polymer composition which exhibits a distinct fibrous morphology with the fibres forming a distinct generally unidirectional grain when observed on a macroscale but with the fibre-portions strongly deflected from this grain direction on a microscale and with said unidirectional grain in at least two of the

films criss-crossing each other, characterized in that one surface of said laminate has a shallow corrugated configuration with the corrugations being generally linearly directed, while the other surface has an essentially smooth planar configuration essentially free of any microtopography.

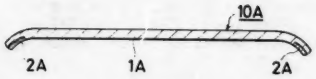
7. A laminate comprising at least two adhered biaxially oriented polymeric films, characterized in that one surface of said laminate has a shallow corrugated configuration with the corrugations being generally linearly directed, while the other surface has an essentially smooth planar configuration essentially free of any microtopography.

4,874,654

VEHICLE WINDOW GLASS

Masaaki Funaki; Koki Kunihiro, and Yutaka Ichinomiya, all of Osaka, Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Filed Jun. 6, 1988, Ser. No. 203,223
Claims priority, application Japan, Jun. 15, 1987, 62-91649[U]
Int. Cl.[4] B32B *3/00, 3/02*
U.S. Cl. 428—192 **16 Claims**



1. A multi colored molded window glass consisting essentially of:

a central part made of a single layer transparent organic glass, and

a peripheral part made of colored organic glass with at least one of translucent and opaque properties made of a transparent organic glass material incorporated with a pigment, said peripheral part being securely attached to a periphery of the central part, forming a composite glass, said window glass having characteristics so that the window glass retains original intended shape and has substantially no distortion of vision at a boundary between the central part and the peripheral part and an accurate surface due to uniform sink and shrinkage.

4,874,655

FUSIBLE TEXTILE PRODUCT AND METHOD OF MANUFACTURE

Pierre Groshens, Peronne, France, assignor to Lainiere de Picardie, France

Filed Nov. 13, 1987, Ser. No. 120,843
Claims priority, application France, Nov. 14, 1986, 86 15878
Int. Cl.[4] B32B *27/14*
U.S. Cl. 428—198 **24 Claims**

1. A thermally-fusible product intended particularly for the textile industry, comprising:

a textile substrate having a pair of opposed external faces;

points of a thermally-fusible polymer distributed on one of said external faces of said substrate to form an interface therewith; and

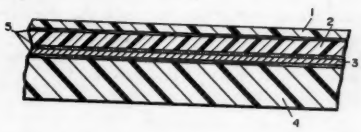
chemical means for acting on said thermally-fusible polymer in order to partially modify the chemical structure of said thermally-fusible polymer at least at said interface so as to prevent said thermally-fusible polymer from flowing through said substrate under the influence of heat, pressure, or steam, said chemical means comprising at least one reactive material selected from the group consisting of thermodurcissable aminoaldehyde products, urea formols and melamine formols, said at least one reactive material reacting with said thermally-fusible polymer in the presence of a reactive means for stimulating, assuring, or promoting the reaction between said reactive material and at least part of said thermally-fusible polymer and in the presence of a mixture comprising at least one of an acid catalyst, an ammonium salt, and a magnesium salt.

4,874,656

MULTI-LAYER PACKAGING MATERIAL

Veikko O. Rantanen, Kauttua, Finland, assignor to A. Ahlstron Corporation, Karhula, Finland

Filed Apr. 27, 1988, Ser. No. 186,854
Int. Cl.[4] B32B *27/06, 27/08*
U.S. Cl. 428—216 **15 Claims**



1. A multi-layer laminate having a high mechanical resistance and an impermeability to gases and vapors, comprising at least the following layers:

(A) a first outer layer of polyester having a thickness of about 12–24 μm;

(B) a first inner layer of oriented polypropylene having a thickness of about 20–40 μm, affixed to the first outer layer of polyester;

(C) a second inner layer of metallic foil having a thickness of about 9–18 μm affixed to the first inner layer of oriented polypropylene;

(D) a second outer layer of polyethylene having a thickness of about 65–130 μm affixed to the second inner layer of metallic foil; and layers of adhesive between said first outer and first inner layers, between said first inner and second inner layers, and between said second inner and second outer layers.

4,874,657

METHODS OF PRODUCING BIAXIALLY-ORIENTED POLYMER PRODUCT, AND THE PRODUCT PRODUCED THEREBY

Ying-Cheng Lo, Mundelein, Ill., and Darral V. Humphries, Allentown, Pa., assignors to Kusan, Inc., Nashville, Tenn.

Continuation-in-part of Ser. No. 806,994, Dec. 9, 1985, Pat. No. 4,789,514. This application Nov. 24, 1986, Ser. No. 933,951
Int. Cl.[4] B29C *55/16, 43/16, 43/48*
U.S. Cl. 428—220 **33 Claims**

18. A method of producing biaxially-oriented polymer sheet from feedstock of solid polymer comprising the steps of:

reducing the thickness of the feedstock between a pair of opposed, continuous belts which converge in at least one zone to biaxially orient the material of the feedstock while reducing the thickness of the feedstock to that of the sheet;

maintaining the temperature of the feedstock between the glass transition temperature and the viscous flow temperature of the material thereof during the step of reducing the thickness of the feedstock; and

restraining the sheet produced by reducing the thickness of the feedstock to the thickness of the sheet so that the sheet stabilizes, whereby the sheet emerges from the restraining step as a sheet having a stable, planar configuration.

28. The sheet produced continuously by the process of claim **18**, wherein the sheet is rectangular in cross-section and in the direction of sheet extent formed of a semi-crystalline thermoplastic polymer which is biaxially-oriented; the sheet having a density which is equal to or greater than the density of the unoriented polymer and having a microstructure substantially devoid of process-induced microvoids and microfibrils; the sheet being comprised of compressed, platelet-like, crystalline aggregates, which are biaxially-oriented in the direction of the sheet extent, the sheet having a substantially uniform distribution of deformed crystalline aggregates over the length and width thereof and through the thickness thereof.

4,874,658

SYNTHETIC FILAMENT-REINFORCED POLYMER MATERIAL SHEET AND PROCESS FOR PRODUCING THE SAME

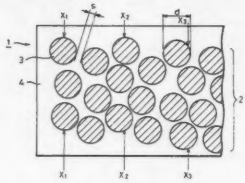
Yoshiyuki Sasaki, Takatsuki, and Tetsuo Okamoto, Ibaraki, both of Japan, assignors to Teijin Limited, Osaka, Japan

Filed Sep. 10, 1987, Ser. No. 95,342

Claims priority, application Japan, Sep. 11, 1986, 61-212780

Int. Cl.[4] B32B *27/04*; D04H *1/06*

U.S. Cl. 428—220 **7 Claims**



1. A synthetic filament-reinforced polymer material sheet having a thickness of 0.25 mm or less and a specific tensile strength of 3.4×10^6 cm or more, and comprising:

a reinforcing sheet comprising a number of individual synthetic polymer filaments straightened and arranged substantially in parallel to each other and spaced from each other at an average interval equal to or smaller than the average thickness of the individual filaments, and having a width W and a thickness T thereof satisfying the relationship:

$$W/T \geq 40$$

and a coefficient of variation in the thickness thereof of 30% or less; and

a polymer material impregnated in the reinforcing sheet to fill the spaces among the individual filaments.

4,874,659

ELECTRET FIBER SHEET AND METHOD OF PRODUCING SAME

Katsutoshi Ando, Otsu, and Yo Ogawa, Kusatsu, both of Japan, assignors to Toray Industries, Tokyo, Japan

Filed Oct. 23, 1985, Ser. No. 790,572

Claims priority, application Japan, Oct. 24, 1984, 59-221976; Jan. 30, 1985, 59-14396

Int. Cl.[4] B30C *3/00*; B29C *71/04*; B32B *33/00*; C07C *3/24*

U.S. Cl. 428—221 **18 Claims**

1. An electret fiber sheet having polarized charges of ordered orientation on the surfaces thereof, said electric fiber sheet being made from a sheet having a weight of 80 g/cm^2 or less and a covering factor of 60% or higher, wherein said electret fiber sheet has at least one measurable activation energy of depolarization of at least 0.2 eV.

11. A process for producing an electret fiber sheet having polarized charges of ordered orientation and having either at least one measurable activation energy of depolarization of at least 0.2 eV or a total amount of polarized charge per unit area of at least 2×10^{-10} C/cm^2 said process comprising the steps of:

placing a fiber sheet having a weight of 80 g/m^2 or less and a covering factor of 60% or higher between a non-contact type voltage-application electrode and an earth electrode facing one another;

placing a supplemental material having a volume resistivity higher than that of said earth electrode and lower than that of said fiber sheet between said earth electrode and said fiber sheet; and

applying voltage of at least 3kV at an electric current density of at least 1×10^{-6} mA/cm^2.

4,874,660

PAPER MACHINE FELTS

Robert B. Davis, Framingham; Charles E. Kramer, Walpole, and Sandra K. Barlow, Blackstone, all of Mass., assignors to Albany Research (UK) Limited, Great Britain

Filed Apr. 14, 1988, Ser. No. 181,389

Claims priority, application United Kingdom, Apr. 15, 1987, 8709067

Int. Cl.[4] B32B *5/02*

U.S. Cl. 428—234 **10 Claims**

1. A felt for use in a paper making machine comprising a woven base and

at least one layer of batt fibre needled thereto, characterised in that said batt fibre comprises fibres of polyamide-12 formed by the extrusion of a melt of polyamide-12 having an intrinsic viscosity of not less than 0.6 dl/gm.

4,874,661

IMPACT ENHANCED PREPREGS AND FORMULATIONS

James M. Browne, 21 Pillon Real, Pleasant Hill, Calif. 94523, and Paul A. Steiner, 732 San Juan Ct., Concord, Calif. 94518

Filed Dec. 15, 1987, Ser. No. 132,287

Int. Cl.[4] B32B *7/00*

U.S. Cl. 428—246 **18 Claims**

1. A prepreg formulation comprising prepreg fabric and filament fibers unidirectionally aligned, a thermosetting matrix resin of a mixed resin and thin surface layers of extremely fine fibers, fibrids or particles of a thermoformable polymer having at least one of a T_m or T_g greater than about 300° C. or no T_m or T_g and a decomposition temperature greater than about 300° C.

4,874,662

PROCESS FOR IMPREGNATING ORGANIC FIBERS

Karl Huhn, Burghausen, Fed. Rep. of Germany, assignor to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany

Filed Aug. 26, 1988, Ser. No. 240,040

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1987, 3730413

Int. Cl.[4] B32B *7/00, 25/00*; C08G *77/26*

U.S. Cl. 428—266 **26 Claims**

1. A process for treating an organic fiber which comprises: Impregnating the organic fiber with a composition comprising an organopolysiloxane (1) containing, in addition to diorganosiloxane units in which the two SiC-bonded organic radicals are monvalent hydrocarbon radicals, at least two monovalent SiC-bonded radicals containing basic nitrogen wherein at least a portion of the SiC-bonded radicals containing basic nitrogen comprise SiC-bonded N-cyclohexylaminoalkyl radicals.

19. A treated fiber of the process of claim **1**.

4,874,663

OVERFINISH FOR ABRASION RESISTANT ZERO TWIST FABRIC

Robert M. Marshall, Chesterfield, Va., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Nov. 23, 1987, Ser. No. 124,202

Int. Cl.[4] B32B *27/02, 33/00;* D06M *13/18, 15/53*

U.S. Cl. 428—272 14 Claims

1. Abrasion resistant fabric woven from synthetic fiber selected from the group consisting of polyester and polyamide, the fabric having been woven from substantially untwisted yarn and treated with an overfinish composition in an amount sufficient to give enhanced abrasion resistance to the fabric, the overfinish composition comprising an aqueous dispersion containing effective amounts of

(a) a crystallizable copolymer consisting essentially of 10 to 50 percent by weight linear polyethylene terephthalate segments having sufficient ethylene terephthalate units to confer crystallinity on the compound and 50 to 90 percent by weight polyoxyethylene terephthalate segments having an average molecular weight of 1000 to 4000, the molar ratio of polyethylene terephthalate to polyoxyethylene terephthalate being from 2:1 to 6:1, the viscosity ratio of the copolymer being between 1.10 and 1.50, and the melting point measured by the temperature of disappearance of birefringence being above 100° C.;

(b) a compound selected from the group consisting of a polyethyleneglycol ester formed by reacting a C_6 to C_{22} fatty acid with ethylene oxide, such that polyoxyethylene segments within the reaction product have an average molecular weight of 200 to 1000, and

a polyethyleneglycol ether formed by reacting a C_6 to C_{22} fatty alcohol with ethylene oxide, such that polyoxyethylene segments within the reaction product have an average molecular weight of 200 to 1000; and

(c) a compound selected from the group consisting of sodium dialkylnaphthalene sulfonate and potassium dialkylnaphthalene sulfonate.

4,874,664

BIREFRINGENT PLATE AND MANUFACTURING METHOD FOR THE SAME

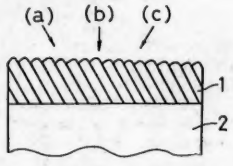
Shigeki Hamaguchi, Aichi; Yasuhiro Ohtsuka, Toyota; Tomoyoshi Motohiro, Seto; Yasunori Taga, Nagoya, and Masahiko Ishii, Aichi, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha and Kabushiki Kaisha Toyota Chuo Kenkyusho, both of Aichi, Japan

Filed Nov. 10, 1987, Ser. No. 118,932

Claims priority, application Japan, Nov. 21, 1986, 61-278981; Nov. 25, 1986, 61-280114

Int. Cl.[4] G02B *5/30, 1/10*

U.S. Cl. 428—325 6 Claims



1. A birefringent plate comprising a transparent substrate and an obliquely evaporated film formed on said transparent substrate by evaporating a dielectric material obliquely to the normal of said transparent substrate, wherein said obliquely evaporated film is composed of at least two layers, said two layers are formed by evaporating said dielectric material in evaporation directions differing from each other, and each of said two layers is composed of inclined columnar structures, the columnar structures of each layer being inclined at an angle differing from that of the columnar structures of the other layer, so as to reduce visual angle dependence.

4,874,665

HEAT SHRINKABLE WRAPS

Anthony J. Doheny, Natick, Mass., assignor to The Kendall Company, Boston, Mass.

Division of Ser. No. 3,091, Jan. 14, 1987. This application Aug. 25, 1988, Ser. No. 236,427

Int. Cl.[4] C09J *7/02*

U.S. Cl. 428—345 5 Claims

1. A heatshrinkable polyolefinic film having a smooth surface and an apposed rough surface, said film being oriented by stretching in the machine direction to increase its length by at least 10 percent, said film further being differentially crosslinked throughout its thickness, the greatest crosslinking being at or near said smooth surface, the extent of crosslinking decreasing as the distance from said smooth surface increases, said rough surface being characterized as being substantially free of crosslinking.

4,874,666

POLYOLEFINIC BICONSTITUENT FIBER AND NONWOVE FABRIC PRODUCED THEREFROM

Eiichi Kubo; Koichi Nagaoka; Yoshiki Miyahara, all of Kyoto; Syunichi Kiriyama, Nara, and Yasunobu Mishima, Kyoto, all of Japan, assignors to Unitika Ltd., Hyogo, Japan

Filed Jan. 12, 1988, Ser. No. 142,962

Claims priority, application Japan, Jan. 12, 1987, 62-5586; Mar. 11, 1987, 55806; Mar. 11, 1987, 55807; May 30, 1987, 137512

Int. Cl.[4] D02G *3/04;* C08L *23/08, 23/12*

U.S. Cl. 428—398 7 Claims

1. A biconstituent fiber produced by melt-spinning a blend comprising 99 to 50 wt % of a linear low-density polyethylene that is a linear low-density copolymer of ethylene and at least one α-olefin having 4 to 8 carbon atoms substantially present in an amount of 1 to 15 wt % and which has a density of 0.900 to 0.940 g/cm^3, a melt index of 25 to 100 g/10 min as measured by the method specified in ASTM D-1238(E), and a heat of fusion of at least 25 cal/g, and 1 to 50 wt % of a crystalline polypropylene having a melt flow rate of less than 20 g/10 min as measured by the method specified in ASTM D-1238(L).

4,874,667

MICROENCAPSULATED PLATINUM-GROUP METALS AND COMPOUNDS THEREOF

Chi-Long Lee, and Robin L. Willis, Jr., both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Jul. 20, 1987, Ser. No. 75,789

The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.

Int. Cl.[4] B32B *27/00, 9/04, 25/00*

U.S. Cl. 428—402.22 7 Claims

1. A microencapsulated liquid compound of a platinum-group metal consisting essentially of microcapsules wherein said liquid compound is completely enveloped within one or two layers of thermoplastic organic polymers, the average diameter of said microcapsules is less than 500 microns, and said thermoplastic organic polymers constitute at least 50 percent of the weight of said microcapsules.

4,874,668

MAGNETIC POWDER AND MAGNETIC RECORDING MEDIUM COMPRISING THE SAME

Seiichi Asada, Osaka; Toshinobu Sueyoshi, and Akira Miyake, both of Kyoto, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed Jul. 7, 1987, Ser. No. 70,697
Claims priority, application Japan, Jul. 9, 1986, 61-162580
Int. Cl.[4] G11B *5/70*
U.S. Cl. 428—403 9 Claims

1. Magnetic powder particles comprising a metal powder and an aluminum-containing oxide which has a corundum structure at least in a surface region of each of said magnetic powder particles.

4,874,669

CURABLE COMPOSITIONS CONTAINING AN EPOXY RESIN, A DIFUNCTIONAL PHENOL AND A POLYFUNCTIONAL PHENOL

Paul A. Larson; Dale J. Aldrich, both of Lake Jackson, and Jody R. Berman, West Columbia, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 15, 1988, Ser. No. 232,414
Int. Cl.[4] C08G *59/08, 59/32;* C08L *63/04*
U.S. Cl. 428—416 44 Claims

1. A compositon which comprises
(A) at least one aromatic based epoxy resin having an average number of epoxide groups per molecule of more than 2; and
(B) a phenolic hydroxyl-containing component consisting essentially of a mixture of
(1) at least one phenolic hydroxyl-containing compound having an average of not more than 2 phenolic hydroxyl groups per molecule; and
(2) at least one phenolic hydroxyl-containing compound having an average of more than 2 phenolic hydroxyl groups per molecule;
(C) optionally, at least one ketone solvent as the only solvent for components (A) and (B); and
(D) optionally, one or more stabilizers; and
wherein components (A) and (B) are present in quantities which provide a ratio of phenolic hydroxyl groups for each epoxy group of from about 0.75:1 to about 1.5:1; component (B1) is present in an amount which provides a ratio of phenolic hydroxyl groups per epoxide group contained in component A of from about 0.1:1 to about 0.65:1; (C) is present in an amount of from about zero to about 75 weight percent based upon the combined weight of components (A), (B), (C) and (D); and component (D) is present in an amount of from about zero to about 1 percent by weight based upon the weight of component (A).

4,874,670

TIRE HAVING CURED PHOTOPOLYMER AIR BARRIER COATING

Wyndham Boon, North Canton; Robert J. Gartland, Austintown, and Patrick J. Pesata, Jr., Medina, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Nov. 30, 1987, Ser. No. 126,989
Int. Cl.[4] B32B *27/00*
U.S. Cl. 428—423.9 30 Claims

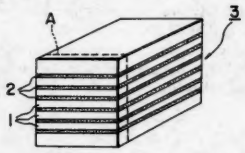
1. A composite elastomer article comprising:
(a) an elastomer having low air permeability, high elongation and low 100 percent modulus, said elastomer being in the form of a sheet or film, said elastomer being a reaction product formed by radiation curing of a composition comprising:
(1) from about 60 to about 90 parts by weight of an end capped prepolymer having a molecular weight in the range of about 2,500 to about 10,000, said prepolymer being a reaction product of (i) a polyester diol having a molecular weight in the range of about 700 to about 1500, and formed by reaction of an alkanediol containing from 2 to about 6 carbon atoms with an aliphatic dicarboxylic acid containing from 2 to about 10 carbon atoms; (ii) an organic diisocyanate and (iii) an addition polymerizable end group compound having one carbon-to-carbon double bond and one hydroxyl group per molecule, wherein the mole ratio of —NCO groups is said diisocyanate to —OH groups in said diol is from about 1.12 to about 1.4, and wherein said end capped prepolymer is prepared by first reacting said polyester diol with said diisocyanate to form a diisocyanate terminated polyester urethane prepolymer comprising alternating units of said polyester diol and said diisocyanate and containing from about 2 to about 8 polyester diol units per mole, and then reacting said diisocyanate terminated prepolymer with said end group compound; and
(2) from about 40 to about 10 parts by weight of a monofunctional addition polymerizable reactive diluent monomer or mixture thereof;
(b) said sheet or film being adhered to a polymeric substrate.

4,874,671

HEAT-RESISTANT ANTI-GLARE SCREEN

Kazutoki Tahara, and Toshihiko Egawa, both of Saitama, Japan, assignors to Shin-Etsu Polymer Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 118,403, Nov. 9, 1987, abandoned, which is a continuation of Ser. No. 853,615, Apr. 18, 1986, abandoned. This application Jul. 20, 1988, Ser. No. 221,644
Claims priority, application Japan, Apr. 22, 1985, 60-86027
Int. Cl.[4] B32B *5/14, 25/20*
U.S. Cl. 428—447 8 Claims



1. An anti-glare screen which comprises (a) a silicone rubber-made anti-glaring base sheet integrally composed of alternately arranged narrow sections of a transparent silicone rubber and a colored and opaque silicone rubber disposed in a stripe-wise manner, (b) a transparent lining sheet of a thermoplastic resin integrally bonded to one surface of the anti-glaring base sheet of silicone rubbers and (c) a layer of a pressure-sensitive adhesive formed on the surface of the anti-glaring base sheet of silicone rubbers not in contact with the transparent lining sheet of a thermoplastic resin.

4,874,672

PLASTIC SUBSTRATE HAVING AN ADHERENT PHOTO-PRODUCT COATING ON ITS SURFACE AND A METHOD OF COATING SAID PLASTIC SUBSTRATE

Robert M. Etter, and Phillip J. Neumiller, both of Racine, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Continuation-in-part of Ser. No. 3,350, Jan. 14, 1987, Pat. No. 4,794,131. This application Feb. 18, 1988, Ser. No. 157,192
The portion of the term of this patent subsequent to Dec. 27, 2005, has been disclaimed.
Int. Cl.[4] B32B *27/28*
U.S. Cl. 428—457 17 Claims

1. A plastic substrate having on its surface an adherent photo-product coating, which coating is formed by exposing to light in the presence of an oxygen source, a reactant mixture having a pH from about 7 to 10.5 comprising:
(a) 2,2',4,4'-tetrahydroxybenzophenone;
(b) ammonium hydroxide; and

(c) optionally a trace amount of at least one reactive metal selected from the group consisting of zinc, copper, nickel, silver, iron, manganese, lead, cobalt, zirconium, mercury, palladium, cadmium, ruthenium, rhodium, and mixtures thereof;

in a solvent.

4,874,673

USE OF FUGITIVE PLASTICIZER IN AUTODEPOSITING COMPOSITION

Joseph C. Donovan, Drexel Hill, and Bashir M. Ahmed, Ambler, both of Pa., assignors to Henkel Corporation, Ambler, Pa.

Continuation of Ser. No. 22,555, Mar. 5, 1987, abandoned, which is a continuation of Ser. No. 684,662, Dec. 20, 1984, abandoned.
This application Nov. 19, 1987, Ser. No. 122,617
Int. Cl.[4] B32B *15/08*
U.S. Cl. 428—463 5 Claims

1. In a process for forming an autodeposition coating on a metallic substrate by immersing said substrate it a autodeposition composition comprising an aqueous latex dispersion, an acid, and an oxidizing agent, for a time effective to impart a coating of a desired thickness, and then heat-curing said coating, the improvement comprising:

(A) employing a latex composition whose resin solid monomers consist essentially of a mixture of

(1) about 1–10 wt. % of acrylic acid or an alkyl substituted acrylic acid;

(2) about 25–50 wt. % of an acrylic ester or an alkyl substituted acrylic ester;

(3) about 15–40 wt. % of a nitrilomonomer; and

(4) about 10–50 wt. % of an addition polymerizable aryl monomer, wherein the percentages are based on the weight of the resin solids; and

(B) adding to said autodeposition composition a plasticizer-effective and film cracking-preventative effective amount of a fugitive plasticizer which is substantially water insoluble and vaporizable at the fusion temperature of said latex composition and which is selected from the group consisting of 2,2,4-tri-methylpentanediol-1,3 monoisobutyrate, tributoxyethyl phosphate, ethylene glycol monochexyl ether, diethylene glycol monochexyl ether, and a mixture of phenyl glycol ethers.

4,874,674

METAL-CERAMIC COMPOSITE BODIES

Isao Oda, and Takao Soma, both of Nagoya, Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Feb. 9, 1987, Ser. No. 12,508
Claims priority, application Japan, Feb. 19, 1986, 61-32851
Int. Cl.[4] F16B *11/00*
U.S. Cl. 428—469 8 Claims

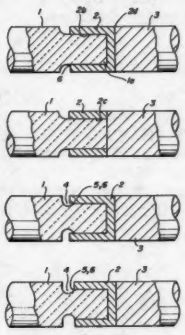
1. A metal-ceramic composite body comprising:

a ceramic member having a protruding portion;

a metallic member; and

an intermediate metallic member positioned between said ceramic member and said metallic member, said intermediate metallic member having a thermal expansion coefficient which is lower than that of said metallic member, said intermediate metallic member having a first end including a concave portion in which said ceramic protruding portion is fitted and a second end joined to said metallic member;

wherein a difference between an outer diameter of said ceramic protruding portion and an inner diameter of said concave portion, after said protruding portion is pulled



from said concave portion, is not less than 0.2% of said outer diameter.

4,874,675

METHOD OF PROTECTING OR RECONDITIONING A SURFACE WITH A POLYMER CONCRETE

Gary W Ceska, Paoli, Pa., assignor to Sartomer Company, Inc., West Chester, Pa.

Division of Ser. No. 800,858, Nov. 22, 1985, Pat. No. 4,722,976.
This application Sep. 25, 1987, Ser. No. 101,082
Int. Cl.[4] B32B *13/12, 27/04;* C08J *5/24*
U.S. Cl. 428—521 12 Claims

1. A method for protecting or reconditioning a surface, which comprises coating, patching, or impregnating the surface with a polymer concrete composition comprising a substantially non-aqueous slurry of (1) an aggregate material and (2) an amount of a monomer binder system effective to bind the aggregate, upon curing, into a polymer concrete, wherein the monomer binder system comprises:

(a) a liquid comonomer component selected from (i) an addition copolymerizable component comprising at least one monoethylenically unsaturated monomer or a mixture of at least one monoethylenically unsaturated monomer and at least one polyethylenically unsaturated monomer, and (ii) a condensation copolymerizable compound having at least one active hydrogen-containing group;

(b) a solid, thermoplastic macromonomer component dissolved in the liquid comonomer component and copolymerizable therewith to form a copolymer, the macromonomer component (b) comprising an anionically polymerized linear polymer terminated at one or both ends with a polymerizable and group, selected from (i) an addition polymer, copolymerizable exclusively with said addition copolymerizable liquid comonomer component (a)(i), of the formula:

$$RZ_nX$$

wherein R is a hydrocarbon group containing up to about 20 carbon atoms, Z is the residue of a vinyl aromatic monomer, n is a positive integer such that the molecular weight of Z is about 2,000–50,000, and X is a polymerizable, monoethylenically unsaturated end group, and (ii) a polymer copolymerizable exclusively with said condensation copolymerizable liquid comonomer component (a)(ii), prepared by polymerizable of at least one conjugated diene, at least one vinyl aromatic hydrocarbon, or a mixture of at least one conjugated diene and at least one vinyl aromatic hydrocarbon, capping with carbon dioxide to provide carboxyl termination, or capping with an alkylene

oxide, alkylene episulfide or sulfur followed by hydrolysis to provide hydroxyl or thiol termination; and

(c) a polymerization catalyst for catalyzing the copolymerization; and permitting the polymer concrete composition to cure under ambient conditions.

4,874,676

SCULPTURE HAVING SIMULATED HAIR

Ruth E. Miller, and Jack V. Miller, both of 700 N. Auburn Ave., Sierra Madre, Calif. 91024

Filed Apr. 25, 1988, Ser. No. 185,396
Int. Cl.[4] A63H *3/44*; B44C *3/06*
U.S. Cl. 428—542.2 9 Claims

1. A piece of sculpture representing an animal having hair including:

a rigid body:

a plurality of thin, elongated metallic link chain strands, each having a first end and a second end;

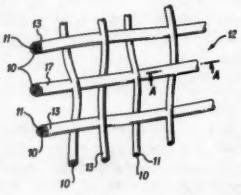
a means of attaching the first end of each chain to the body, leaving the second end hanging free and representing hair.

4,874,677

MATRIX MATERIAL FOR REGENERATORS

Dieter Reiche, Dresden; Matthias Thuerk, and Roderich Duerselen, both of Jena, all of Fed. Rep. of Germany, assignors to Veb Hochvakuum Dresden, Dresden, German Democratic Rep.

Filed Sep. 20, 1988, Ser. No. 247,021
Claims priority, application German Democratic Rep., Nov. 2, 1987, 308515
Int. Cl.[4] B23P *17/06*
U.S. Cl. 428—605 4 Claims



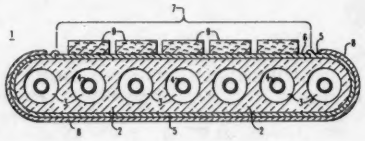
1. A matrix material for regenerators, comprising a plurality of screen meshes, each of which consist of a stable basic mesh, with wire diameters between 0.005 and 0.015 mm and of a lead sheathing with a thickness of 0.025 to 0.075 mm, is layered into a stack.

4,874,678

ELONGATED SOLID ELECTROLYTE CELL CONFIGURATIONS AND FLEXIBLE CONNECTIONS THEREFOR

Philip Reichner, Plum Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 10, 1987, Ser. No. 130,927
Int. Cl.[4] H01M *8/10, 2/00, 4/86*
U.S. Cl. 429—30 15 Claims



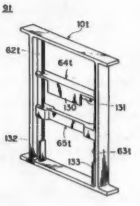
1. A high-temperature solid electrolyte, flat, axially elongated, electrochemical cell combination, having a large cushion area of flexible, current collector material, comprising: a wide, porous, inner electrode having a top surface and a plurality of axial, interior gas feed chamber, where the cross-sectional width of the inner electrode is transverse to the axial, interior gas feed chambers; solid electrolyte contacting the inner electrode except for a major portion of the inner electrode top surface; outer electrode contacting the electrolyte; non-porous; ceramic, electronically conducting interconnection material contacting the inner electrode and covering the portion of the inner electrode top surface not covered by electrolyte, where the interconnection material covers from 60% to 100% of the cross-sectional width of the inner electrode; and at least one axially elongated, electronically conductive, flexible, porous, metal fiber, current collector-cushioning strip material in electronic connection with the inner electrode through contact with from about 20% to 100% of the interconnection material width.

4,874,679

STORAGE BATTERY WITH INDICATING DEVICE

Shiro Miyagawa, Osaka, Japan, assignor to Miyagawa Kasei Industry Co., Ltd., Osaka, Japan

Filed Jul. 11, 1988, Ser. No. 217,543
Claims priority, application Japan, Jul. 11, 1987, 62-173491; Nov. 5, 1987, 62-280210; Feb. 2, 1988, 63-23557; Feb. 2, 1988, 63-23558; Mar. 1, 1988, 63-48341
Int. Cl.[4] H01M *10/48*
U.S. Cl. 429—91 28 Claims



1. A storage battery, comprising a casing for containing an electrolyte, a window (6) in said casing for viewing the interior of the casing through said window in a lateral wall (4) of the casing, indicating means (9*t*) installed in said casing behind said window for indicating changes in the electrolyte liquid level and in the specific gravity of the electrolyte, said indicating means comprising a pair of guide rails (62*t*, 63*t*) vertically extending in parallel to said lateral wall in which said window is formed, first and second floats (64*t* and 65*t*) disposed be-

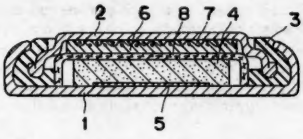
tween said guide rails in a position visible through said window, said floats having at their respective opposite ends guide portions slidably fitted on said pair of guide rails, said first float (64*f*) having a specific gravity so that the first float always floats on the liquid surface of the electrolyte for indicating an electrolyte level in said casing, said second float (65*f*) being disposed below said first float (64*f*) and having such a buoyancy that the second float will rise and sink according to changes in the specific gravity of the electrolyte for indicating the specific gravity of the electrolyte, and said first float (64*f*) having a shield (130) for hiding said second float (65*f*) from the field of vision through said window when said second float (65*f*) is floating.

4,874,680

LITHIUM SECONDARY BATTERY

Nobuharu Koshiba, Nara; Toshihiko Ikehata, Katano, and Kenichi Takata, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 13, 1988, Ser. No. 283,806
Claims priority, application Japan, Oct. 21, 1988, 63-266346
Int. Cl.[4] H01M *6/16*
U.S. Cl. 429—197 **11 Claims**



1. A lithium secondary battery which comprises:
a positive electrode made of vanadium pentoxide as a principle component;
a negative electrode made of lithium absorbing alloy;
an electrolyte prepared from an organic solvent dissolved with lithium salt; and
said lithium absorbing alloy being an alloy containing aluminum as a principle component, the amount of lithium absorbed by the alloy being not greater than 8 wt % relative to the weight of the vanadium pentoxide and not smaller than 4 wt relative to the alloy containing the aluminum as the principal component.

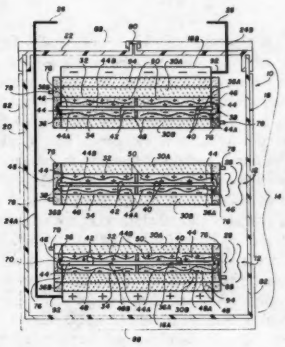
4,874,681

WOVEN-GRID SEALED QUASI-BIPOLAR LEAD-ACID BATTERY CONSTRUCTION AND FABRICATING METHOD

Wally E. Rippel, 3308 Alegre La., Altadena, Calif. 91001

Filed Apr. 14, 1988, Ser. No. 181,745
Int. Cl.[4] H01M *10/18*
U.S. Cl. 429—210 **22 Claims**

1. In a bipolar battery construction, the combination comprising:
a plurality of bipolar cells disposed in side-by-side relation to form a stack of said cells;
said each bipolar cell being loaded with an electrolyte and composed of a bipolar electrode plate and a pair of separator plates disposed on opposite sides of said electrode plate;
said bipolar electrode plate of each cell being composed of a partition sheet and a pair of bipolar electrode elements folded into a hairpin configuration and applied over opposite edges of said partition sheet so as to cover opposite surfaces of adjacent halves of said partition sheet;
said partition sheet and electrode elements of said electrode plate of each cell together defining a peripheral border portion about said electrode plate containing sealable means, said pair of separator plates each cell having respective peripheral border portions containing sealable means bonded directly to said sealable means on said peripheral border portion of said electrode plate to form



each of said cells in said stack thereof as an individual self-contained sealed unit separate from one another.

4,874,682

ORGANIC PHOTOCONDUCTORS WITH REDUCED FATIGUE

John Campbell Scott, Los Gatos, and Meredith D. Shattuck, Hollister, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 28, 1988, Ser. No. 264,464
Int. Cl.[4] G03G *5/14*
U.S. Cl. 430—59 **5 Claims**

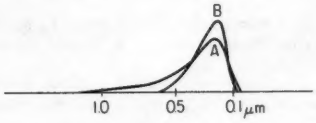
1. An organic photoconductor comprising a charge generation layer and a charge transport layer which is a source of acidic protons, said charge transport layer comprising a charge transport material, a binder and distributed uniformly throughout said charge transport layer a nonvolatile basic amine selected from the group consisting of 1,8-bis-(dimethylamino)-naphthalene and poly(vinyl pyridine).

4,874,683

LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY

Miyuki Shirai, and Akira Nogami, both of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 893,026, Aug. 1, 1986, abandoned. This application Sep. 6, 1988, Ser. No. 241,832
Claims priority, application Japan, Aug. 9, 1985, 60-176527
Int. Cl.[4] G03G *11/00, 9/12*
U.S. Cl. 430—114 **7 Claims**



1. A liquid developer for electrophotography, said developer comprising a non-aqueous solvent having toner particles dispersed therein, said particles comprising:
a colorant;
a high molecular compound produced in a non-aqueous medium by polymerization of a first monomer component, said first component being soluble in said non-aqueous solvent and being represented by general formula 1

wherein R is selected from H, $-CH_3$, and $-C_2H_5$,

A is selected from $-COOC_nH_{2n+1}$ and $-OC_nH_{2n+1}$, n being an integer of from 6 to 20, and a second monomer component insoluble or slightly soluble in said aqueous solution, said second component being at least one monomer selected from vinyl monomers and vinyl carboxylic acid monomers, provided that the monomers are substituted with a substitutent so that Taft's aliphatic polar substituent constant σ is not less than 0.45 in absolute value, and said high molecular compound is present in an amount of from 2.5×10^{-4} to 5.5×10^{-4} mols per gram of said colorant and;

a thermoplastic resin selected from the group consisting of waxes, polyolefins, and mixtures thereof, which is insoluble or slightly soluble in said non-aqueous solvent at ordinary temperatures, wherein said thermoplastic resin comprises from 5 to 95% of the total amount of said high molecular compound and said thermoplastic resin, and the number of toner particles having a diameter less than 0.06 μm is not more than 5%, and the number of particles exceeding 1.5 μm in diameter is not more than 3%, both based on the total number of toner particles.

4,874,684

LIGHT-SENSITIVE MATERIAL CONTAINING SILVER HALIDE, REDUCING AGENT AND POLYMERIZABLE COMPOUND IN MICROCAPSULES SEPARATELY SENSITIZED

Soichiro Yamamoto, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 3, 1987, Ser. No. 92,841
Claims priority, application Japan, Sep. 3, 1986, 61-208786
Int. Cl.[4] G03C *1/72*
U.S. Cl. 430—138 **6 Claims**

1. A light-sensitive material comprising a light-sensitive layer which contains silver halide, a reducing agent, an ethylenically unsaturated polymerizable compound and a color image forming substance provided on a support, wherein the silver halide, the polymerizable compound and the color image forming substance are contained in at least four kinds of microcapsules (I), (II), (III) and (IV) which are dispersed in the light-sensitive layer, and wherein

each of the microcapsules (I), (II) and (III) differs form each other with respect to the spectral sensitivity of the silver halide,

the difference between the spectral sensitivity peaks of any two kinds of the microcapsules (I), (II) and (III) is not less than 60 nm,

the hue of the color image forming substance contained in the microcapsule (I) is the same as that in the microcapsule (II),

the hue of the color image forming substance contained in the microcapsule (III) is different from those in the microcapsules (I) and (II),

the spectral sensitivity of the silver halide and the hue of the color image forming substance contained in microcapsules (IV) is different from those of microcapsules (I), (II) and (III), and

said three hues of the color image forming substances contained in microcapsules (I), (II), (III) and (IV) are yellow, magenta and cyan.

4,874,685

PHOTOCURABLE COMPOSITION CONTAINING A PHOTOREDUCIBLE DYE A THIOL AND AN N,N'-DIALKYLANILINE

Paul C. Adair, Springboro, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed Nov. 27, 1987, Ser. No. 125,963
Int. Cl.[4] G03C *1/72*
U.S. Cl. 430—138 **11 Claims**

1. A dye-sensitized photopolymerizable composition comprising a free radical addition polymerizable material, and a photoinitiator, said photoinitiator consisting essentially of a photoreducible dye, a thiol and an N,N'-dialkylaniline.

4,874,686

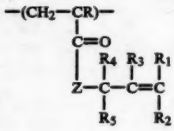
PHOTOSENSITIVE LITHOGRAPHIC PLATE NECESSITATING NO DAMPENING WATER

Yoshihiko Urabe; Tatsuji Higashi; Hiroshi Takahashi, and Nobuyuki Kita, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Mar. 13, 1989, Ser. No. 322,511
Claims priority, application Japan, Mar. 18, 1988, 63-65038
Int. Cl.[4] G03C *1/68, 1/70, 1/71*
U.S. Cl. 430—272 **12 Claims**

1. A photosensitive lithographic plate necessitating no dampening water and comprising, on a support, a photosensitive layer and a silicone rubber layer in this order, said rubber layer being formed by addition reaction of SiH group with a —CH=CH— group to cause crosslinking, characterized in that said photosensitive layer comprises the following components:

(1) a polymer comprising at least a structural unit of the following general formula (I):

 [I]

wherein R represents a hydrogen atom or a methyl group; R_1, R_2, R_3, R_4 and R_5 each represents a member selected from the group consisting of a hydrogen atom, a halogen atom, a carboxyl group, a sulfo group, a or anitro group, a cyano group, an amido group, an amino group, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an alkylamino group, an arylmino group, an alkylsulfonyl group and an arylsulfo group; and Z represents an oxygen atom, a sulfur atom, —NH—, $-NR_6-$ (R_6 represents an alkyl group), $-OCH_2CH_2O-$ or $-OCH_2CH(OH)-$, and

(2) a photopolymerization initiator.

4,874,687

METHOD FOR FORMING AN IMAGE

Masamichi Itabashi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 18, 1987, Ser. No. 122,716
Claims priority, application Japan, Nov. 18, 1986, 61-274917
Int. Cl.[4] G03C *5/24, 5/36, 5/38, 1/30*
U.S. Cl. 430—446 **27 Claims**

1. A method for forming a silver image comprising the steps of:

(a) imagewise exposing a light-sensitive silver halide photographic material comprising a support having provided on at least one surface thereof a light-sensitive chemically sensitized silver halide emulsion, at least one of an active halogen hardening agent and a bisvinylsulfone hardening agent, and a slightly water-soluble basic metallic compound; and

(b) developing said exposed material with a developer solution containing a compound capable of reacting with said basic metallic compound to release a base.

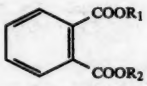
4,874,688

SILVER HALIDE PHOTOGRAPHIC MATERIALS COMPRISING SPECIFIC ORGANIC SOLVENTS

Takashi Ozawa, and Hidetoshi Kobayashi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 4, 1988, Ser. No. 164,372
Claims priority, application Japan, Mar. 4, 1987, 62-49083
Int. Cl.[4] G03C *7/26, 1/06*
U.S. Cl. 430—546 6 Claims

1. A silver halide photographic material comprising a support having provided thereon at least one hydrophilic organic colloid layer, said at least one layer comprising one or more photographic additives dispersed therein with at least one phthalic acid ester of the general formula (I):



(I)

where R_1 and R_2, which may be same or different, each represents a branched alkyl group having 7 carbon atoms.

4,874,689

SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Junichi Yamanouchi; Shigetoshi Ono; Tsumoru Hirano; Toshiyuki Watanabe; Nobuo Sakai, and Keiji Mihayashi, Minami-Ashigara, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 22, 1987, Ser. No. 52,881
Claims priority, application Japan, May 24, 1986, 61-119902
Int. Cl.[4] G03C *7/32*
U.S. Cl. 430—548 19 Claims

1. A silver halide color photographic material comprising at least one non-diffusive lipohilic polymer coupler having a number-average molecular weight of about 1,000 to about 10,000 produced by a polymerization reaction which employs a chain-transfer agent having 8 or more carbon atoms.

4,874,690

LYOPHILIZATION OF RED BLOOD CELLS

Raymond P. Goodrich, Jr.; Christine M. Williams, both of Pasadena, Calif.; Robert S. Franco, and Murray Weiner, both of Cincinnati, Ohio, assignors to Cryopharm Corporation, Pasadena, Calif.

Filed Aug. 26, 1988, Ser. No. 237,588
Int. Cl.[4] A01N *1/02*
U.S. Cl. 435—2 9 Claims

1. A process for the lyophilization of erythrocytes, comprising immersing a plurality of erythrocytes in a buffered solution which includes:

a monosaccharide which is present in the solution in a concentration of from about 7.0 to 37.5%;

a polymer having a molecular weight of from about 5K to about 80K which is present in a concentration of from about 0.7% up to saturation in the solution;

a polyanion which is present in a concentration of from 0.01 weight percent up to saturation in the solution;

freezing the solution; and

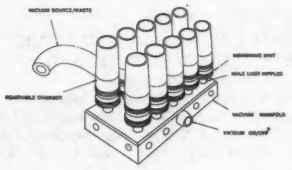
drying the erythrocytes by sublimation of the water.

4,874,691

MEMBRANE-SUPPORTED IMMUNOASSAYS

Howard Chandler, West Vancouver, Canada, assignor to Quadra Logic Technologies Inc., Vancouver, Canada

Filed Oct. 16, 1987, Ser. No. 109,436
Int. Cl.[4] G01N *33/544*
U.S. Cl. 435—7 32 Claims



1. A method to conduct an assay for an analyte in a sample, wherein the analyte binds to an affinity partner, which method comprises:

drawing a volume of said sample by means of a pressure gradient through a membrane in which the affinity partner for the analyte is contained into a receiving chamber on which said membrane is mounted,

wherein said pressure gradient is obtained by creating a partial vacuum in said receiving chamber, and

detecting the analyte bound in the membrane.

4,874,692

BINDER COMPOSITION AND ANALYTICAL ELEMENT HAVING STABILIZED PEROXIDASE IN LAYER CONTAINING THE COMPOSITION

Jon N. Eikenberry, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 20, 1987, Ser. No. 75,480
Int. Cl.[4] G01N *33/50*
U.S. Cl. 435—7 17 Claims

12. A method for the determination of an immunologically reactive ligand comprising the steps of:

A. in the presence of a receptor for said ligand, contacting a sample of a liquid suspected of containing the ligand with an analytical element comprising an absorbent carrier material having a water-soluble layer containing a peroxidase-labeled ligand analog for the ligand uniformly distributed in from 0.1 to 10.0 g/m^2 of poly(vinylalcohol) and from 0.2 to 20 g/m^2 of glycerol; provided that the concentration of the glycerol in the layer is greater than 1.0 times the concentration of poly(vinylalcohol); and

B. determining the amount of the ligand as a result of the presence of complexed or uncomplexed ligand analog.

4,874,693

METHOD FOR ASSESSING PLACENTAL DYSFUNCTION

Mark Bogart, 3432 Pershing Ave., San Diego, Calif. 92104

Filed Oct. 10, 1986, Ser. No. 917,985
Int. Cl.[4] G01N *33/53, 33/543, 33/577;* C12Q *1/68*
U.S. Cl. 435—7 17 Claims

1. A method for identifying a pregnant women with substantial risk of gestating a fetus having an aneuploid chromosomal abnormality, comprising

a. combining bodily fluids taken from said female gestating said fetus during the 18th through 25th weeks of her pregnancy in an aqueous buffered assay medium with labeled human chorionic gonadotropin (HCG) hormone, wherein said label provides a detectable signal and antibodies to HCG;

b. determining the amount of labeled HCG either bound or unbound to said antibodies as a measure of HCG in said sample; and

c. comparing the level of said HCG in said sample with levels of HCG measured during the same time interval of pregnancy in women gestating normal fetuses, said comparison being determinative of the presence of the aneuploid abnormality in said fetus.

4,874,694

USE OF PHOSPHOPROTEIN PATTERNS FOR DIAGNOSIS OF NEUROLOGICAL AND PSYCHIATRIC DISORDERS

Samuel E. Gandy, and Paul Greengard, both of New York, N.Y., assignors to The Rockefeller University, New York, N.Y.

Filed Apr. 7, 1987, Ser. No. 35,347

Int. Cl.[4] C12Q *1/48*; C07G *17/00, 15/00*; C07K *3/12*

U.S. Cl. 435—15 **12 Claims**

1. A method for analyzing the cerebrospinal fluid of a mammal to determine the presence or development of a neurological or psychiatric pathology selected from the group consisting of Alzheimer disease, Huntington disease, Parkinson disease, dystonia, ataxia, schizophrenia, epilepsy, brain tumor, brain irradiation, head trauma, acute and chronic encephalitic and vascular disease, which comprises:

(a) incubating a sample of said mammalian cerebrospinal fluid in the presence of 32-P labelled adenosine triphosphate (ATP) and a protein kinase capable of transferring phosphate from the adenosine triphosphate (ATP);

(b) terminating the reaction in (a) after a pre-determined time;

(c) applying a sample of the terminated reaction of (b) to a gel for electrophoresis to form a sampled gel;

(d) electrophoresing the sampled gel of (c);

(e) performing autoradiography on the electrophoresed gel of (d);

(f) comparing the pattern of the autoradiography of (e) with a set of sample patterns of known neurological and psychiatric pathologies to ascertain the particular pathology of the cerebrospinal fluid being analyzed.

4,874,695

RAPID INDENTIFICATION OF YEAST AND OTHER FUNGAL MICROORGANISMS BY ENZYME DETECTION

David H. Pincus, New Hyde Park, N.Y., assignor to American Home Products Corp., New York, N.Y.

Continuation-in-part of Ser. No. 473,381, Mar. 8, 1983, abandoned. This application Feb. 21, 1985, Ser. No. 703,644

Int. Cl.[4] C12Q *1/44, 1/36, 1/04*; C12P *19/24*

U.S. Cl. 435—19 **13 Claims**

1. A method for the rapid identification of microorganisms within about 6 hours of incubation of said microorganisms selected from the group consisting of genera and species of yeast and other fungal microorganisms comprising:

(a) culturing an unknown yeast or other fungal microorganisms in a non-inhibitory mycological culture medium for 48 to 72 hours at 25°–30° C. to stimulate the production or multiply the presence of colonies containing one or more enzymes characteristic of said microorganism;

(b) suspending and homogenously mixing, from the medium of step(a), a sufficient number of morphologically similar colonies of the so cultured unknown microorganism containing said enzyme(s) in an aqueous suspending medium to prepare an inoculum having a turbidity equivalent of at least McFarland No. 3 of the unknown microorganism;

(c) separately mixing the inoculum with one or more substrates selected from a first group selected from the group consisting of chromogenic substrates for detecting the presence or absence of acetate esterase, leucyl-glycine aminopepetidase, and glycyl-glycine aminopeptidase, said chromogenic substrates capable of reacting with said enzyme(s) to produce a colored product or a product convertible to a colored product said products selected from the group consisting of β-naphthylamine, p-nitroaniline, indoxyl, o-nitrophenol, p-nitrophenol, β-naphthol and substituted naphtols and said substrates further defined as being the esters and amides formed between the group consisting of acetic acid, leucyl-glycine and glycyl-glycine with the products;

(d) incubating the inoculum substrate mixtures of step(c) at about 36° C. from about 2 to about 6 hours to obtain the product(s) whereby the unknown yeast or other fungal microorganism is identified by comparing detected enzyme activity characteristic of said microorganism with characteristic enzyme activity of known genera and species of yeast and other fungal microorganisms.

4,874,696

NOVEL BACTERIUM INDUCIBLE TO PRODUCE UNIQUE STEROID-TRANSFORMING ENZYMES: PREPARATION AND APPLICATIONS THEREOF

Donna W. Payne, Columbia, and Paul Talalay, Baltimore, both of Md., assignors to The Johns Hopkins University, Med School, Baltimore, Md.

Filed Oct. 23, 1985, Ser. No. 790,447

Int. Cl.[4] C12Q *1/32*; C12N *9/04*; C12R *1/05*

U.S. Cl. 435—26 **16 Claims**

3. An enzymatic assay for detecting hydroxyl or carbonyl compounds comprising reacting a hydroxyl or carbonyl compound or both in a buffered medium with an an NAD or NADP linked-dehydrogenase having specificity for reacting with said compound, transferring hydrogen from NADH or NADPH to an analog of NAD or NADP and measuring the rate of accumulation of the reduced analog of NAD or NADP.

4,874,697

NOVEL HOST *E. COLI* AND USE THEREOF

Keijiro Sugimura; Shunjiro Sugimoto, and Hounai Shirasawa, all of Osaka, Japan, assignors to Suntory Limited, Osaka, Japan

Filed Dec. 29, 1986, Ser. No. 947,398

Claims priority, application Japan, Dec. 27, 1985, 60-295140

Int. Cl.[4] C12P *21/00*; C12R *1/185*

U.S. Cl. 435—68 **5 Claims**

1. A protease deficient mutant derived from Escherichia coli strain W3110, said mutant being designated W3110(M25):FERM BP-1097.

4. A process for producing human immune interferon, said process comprising the steps of:

(a) culturing Escherichia coli strain W3110(M25) transformed with a plasmid containing the human immune interfron gene or derivatives thereof, and

(b) extracting and/or purifying the interferon therefrom.

4,874,698

PROCESS FOR PRODUCING TRYPTOPHAN

Akio Ozaki; Ryoichi Katsumata, both of Tokyo, and Tetsuo Oka, Yokohama, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 580,815, Feb. 16, 1984. This application Jul. 16, 1987, Ser. No. 73,888

Claims priority, application Japan, Feb. 17, 1983, 58-25398

Int. Cl.[4] C12P *13/22*; C12N *1/20, 15/00*; C12R *1/13*

U.S. Cl. 435—108 **8 Claims**

1. A process for producing tryptophan, which comprises:

transforming a host microorganism belonging to the genus Corynebacterium or Brevibacterium with a vector containing a DNA fragment containing an anthranilic acid synthetase gene isolated from Brevibacterium flavum ATCC 14067 or Corynebacterium glutamicum ATCC 13032, culturing the transformant in a nutrient medium containing a molasses carbon source, accumulating tryptophan in the culture medium and recovering tryptophan therefrom.

4,874,699

REACTION METHOD FOR TRANSESTERIFYING FATS AND OILS

Shoji Maruzeni; Wataru Matsumoto, and Nozomi Yasuda, all of Tokyo, Japan, assignors to Asahi Denka Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 611,964, May 18, 1984, abandoned. This application Aug. 21, 1986, Ser. No. 898,513

Claims priority, application Japan, May 19, 1983, 58-88167; Jul. 12, 1983, 58-126392; Mar. 26, 1984, 59-57739

Int. Cl.[4] C12P 7/62

U.S. Cl. 435—135 27 Claims

1. A two-step reaction method for the transesterification of fats and oils, comprising:

(a) hydrolyzing fats and oils to produce diglycerides by reacting said fats and oils with lipase having 1,3 position specificity in the presence of 0.01 to 0.10 parts by weight of water per 1 part by weight of fats and oils;

(b) esterifying said diglycerides to produce triglycerides by reacting said diglycerides with at least one fatty acid while at the same time removing water from said reaction to increase the rate of esterification and reduce the rate of hydrolyzation, the first and/or second reaction steps being carried out by adding an aliphatic monohydric alcohol having 4 to 18 carbon atoms to the reaction system, wherein the amount of alcohol being added corresponds to 50–90 mol % of free fatty acid estimated to be produced if added in the first step, and the amount of alcohol being added corresponds to 50–90 mol. % of remaining free fatty acid, if added in the second step.

4,874,700

PROCESS FOR THE PRODUCTION OF L-MALIC ACID

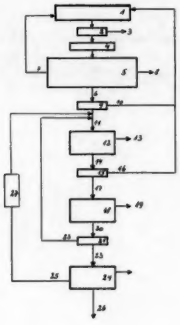
Reinhold Seipenbusch, Gladbeck, Fed. Rep. of Germany, assignor to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Sep. 20, 1985, Ser. No. 778,464

Claims priority, application Fed. Rep. of Germany, Sep. 22, 1984, 3434918

Int. Cl.[4] C12P 7/46

U.S. Cl. 435—145 17 Claims



1. A process for preparing L-malic acid by separation from a reaction mixture produced in the biotechnical conversion of fumaric acid salts to L-malic acid salts, which mixture is substantially free of cellular substances

comprising

electrodialysing the reaction mixture in an electrodialysis unit having at least three cells separated from one another by dialysis membranes thereby continuously separating out three solutions, which are an acid concentrate solution containing L-malic acid and fumaric acid, an alkali concentrate solution containing the hydroxide of the cation of the fumaric acid and L-malic acid salts, and a diluted product solution containing nonionic components of the reaction mixture and residual fumarate and L-malate; and

recovering purified L-malic acid by concentration/crystallization of the acid concentrate

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4,874,701

PREPARATION OF CONIFERYLALDEHYDE BY A MICROORGANISM

Bryan Cooper, Mannheim, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Feb. 9, 1987, Ser. No. 12,495

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1986, 3604874

Int. Cl.[4] C12P 7/24, 7/02, 7/22

U.S. Cl. 435—147 4 Claims

1. A process for preparing coniferylaldehyde, which comprises:

cultivating Arthrobacter globiformis DSM 3597 or a mutant thereof, in the presence of n-eugenol, and

allowing coniferylaldehyde to accumulate, wherein said mutant of Arthrobacter globiformis DSM 3597 is one which is capable of converting n-eugenol into coniferylaldehyde without further changing the coniferylaldehyde.

4,874,702

VECTORS AND METHODS FOR MAKING SUCH VECTORS AND FOR EXPRESSIVE CLONED GENES

Walter C. Fiers, Destelbergen, and René Erik Remaut, Vinderhoute, both of Belgium, assignors to Biogen, Inc., Cambridge, Mass.

Continuation of Ser. No. 250,608, Apr. 3, 1981, abandoned. This application Oct. 20, 1986, Ser. No. 921,803

Claims priority, application United Kingdom, Sep. 8, 1980, 8028983

Int. Cl.[4] C12N 15/00, 1/20; C12P 21/00

U.S. Cl. 435—172 18 Claims

1. A plasmid vector comprising at least one DNA sequence comprising the leftward promoter and operator derived from bacteriophage λ, P_LO_L, said DNA sequence further comprising at least one endonuclease recognition site located less than 300 base pairs downstream from P_LO_L and located between P_LO_L and any sequences of λ DNA downstream of the HaeIII site at 73.1% of bacteriophage λ in said DNA sequence.

4,874,703

EXPRESSION VECTORS FOR USE IN *E. COLI*

S. Richard Jaskunas, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Aug. 26, 1985, Ser. No. 769,221

Int. Cl.[4] C12N 15/00, 1/20; C07H 15/12; C12P 1/04

U.S. Cl. 435—252.33 24 Claims

1. The lambda pL-Ipp hybrid transcriptional and translational activating sequence of the following structure:

```
                10                  20                  30
5'-GATCTCTCAC CTACCAAACA ATGCCCCCCT
   |||||||||| |||||||||| ||||||||||
3'-CTAGAGAGTG GATGGTTTGT TACGGGGGGA

                40                  50                  60
GCAAAAAATA AATTCATATA AAAAACATAC
|||||||||| |||||||||| ||||||||||
CGTTTTTTAT TTAAGTATAT TTTTTGTATG

                70                  80                  90
AGATAACCAT CTGCGGTGAT AAATTATCTC
|||||||||| |||||||||| ||||||||||
TCTATTGGTA GACGCCACTA TTTAATAGAG

                100                 110                 120
TGGCGGTGTT GACATAAATA CCACTGGCGG
|||||||||| |||||||||| ||||||||||
ACCGCCACAA CTGTATTTAT GGTGACCGCC
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-continued

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          130                 140                 150
TGATACTGAG  CACATCAGAT  CTATTAACTC
||||||||||  ||||||||||  ||||||||||
ACTATGACTC  GTGTAGTCTA  GATAATTGAG

          160                 170
AATCTAGAGG  GTATTAATAA  TG—3'
||||||||||  ||||||||||  ||
TTAGATCTCC  CATAATTATT  AC—5'
```

wherein

A is deoxyadenyl;

G is deoxyguanyl;

C is deoxycytidyl; and

T is thymidyl.

24. A plasmid selected from the group consisting of plasmids pKC283PX, pKC283-L, pKC283-LB, pL32, pKC283PRS, pPR12ΔR1 and pPR12AR1.

4,874,704

METHOD FOR INHIBITING FOOD-BORNE HUMAN PATHOGENS AND PREVENTING MICROBIAL SPOILAGE IN REFRIGERATED FOODS USING A LACTOBACILLUS

Donald P. Boudreaux; Mark A. Matrozza, both of Sarasota, and Marianne F. Leverone, Bradenton, all of Fla., assignors to Microlife Technics, Inc., Sarasota, Fla.

Continuation-in-part of Ser. No. 49,852, May 15, 1987. This application Mar. 14, 1988, Ser. No. 167,556

Int. Cl.[4] C12N *1/20*

U.S. Cl. 435—252.9 **23 Claims**

1. A method for inhibition of food-borne human pathogen or spoilage microorganisms in a refrigerated processed food which has been subjected to a treatment and then packaged prior to consumption which comprises:

(a) inoculating the processed food following any heat treatment of the food which would inactivate the cells with a number of cells of a Lactobacillus which remain viable during refrigerated storage without fermentation of the food by the Lactobacillus and which cells produce hydrogen peroxide during the refrigerated storage to inhibit the microorganisms; and

(b) storing the food in the package at refrigeration temperatures which prevent the number of the cells from increasing significantly except during transient temperature abuse to thereby inhibit the microorganisms.

4,874,705

DNA ENCODING AN ANTIGENIC PROTEIN DERIVED FROM *EIMERIA TENELLA* AND VACCINES FOR PREVENTION OF COCCIDIOSIS CAUSED BY *EIMERIA TENELLA*

William H. Andrews, Belmont; Virginia M. Brothers, Albany; James G. Files, Belmont; Irene Kuhn, San Francisco; Michael T. McCaman, San Bruno; Leland S. Paul, Woodside; Stacey R. Sias, San Anselmo, all of Calif.; Thomas C. Gore, Charles City; Karel Z. Newman, Jr., Clear Lake, both of Iowa, and John L. Tedesco, St. Peters, Mo., assignors to Solvay & Cie, S.A., Brussels, Belgium

Continuation-in-part of Ser. No. 734,085, May 16, 1985, which is a continuation-in-part of Ser. No. 617,483, Jun. 5, 1984, abandoned. This application Dec. 6, 1985, Ser. No. 805,824

Int. Cl.[4] C12N *1/20, 15/00*; C07H *21/04*

U.S. Cl. 435—252.33 **26 Claims**

1. An isolated genomic DNA molecule having the mucleic acid sequence set forth in FIG. 1 and encoding an antigenic protein derived from *Eimeria tenella*, the protein having a molecular weight of about 25,000 daltons and being composed of two polypeptides joined by a disulfide bond, one of the polypeptides being characterized by a molecular weight of about 17,000 daltons and by a blocked N-terminal amino acid and having the amino acid sequence set forth in FIG. 1 and the other of the polypeptides being characterized by a molecular weight of about 8,000 daltons and having the amino acid sequence set forth in FIG. 1.

4,874,706

MANUFACTURE AND USE OF TAGETITOXIN

Richard D. Durbin, Cross Plains, Wis.; Jean H. Lukens, Cambridge, Mass.; Thomas F. Uchytil, and Nicholas Rhodehamel, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Continuation-in-part of Ser. No. 906,486, Sep. 10, 1986, abandoned. This application Feb. 17, 1987, Ser. No. 15,174

Int. Cl.[4] C12R *1/38*

U.S. Cl. 435—253.3 **5 Claims**

1. A biologically pure culture of a strain of *Pseudomonas syringae* pv. tagetis which has been mutated to produce tagetitoxin at a level at least ten fold higher than wild-type strain.

4,874,707

PROCESS FOR PRODUCING AN AQUEOUS SUSPENSION OF NITRIFYING BACTERIA

Eberhard Bock, Hamburg, Fed. Rep. of Germany, assignor to TetraWerke Dr.rer.nat. U. Baensch GmbH, Herrenteich, Fed. Rep. of Germany

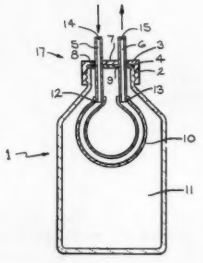
PCT No. PCT/EP87/00538, § 371 Date Jul. 25, 1988, § 102(e) Date Jul. 25, 1988, PCT Pub. No. WO88/02397, PCT Pub. Date Apr. 7, 1988

PCT Filed Sep. 22, 1987, Ser. No. 249,913

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1986, 3632532

Int. Cl.[4] C12N *1/20*

U.S. Cl. 435—253.6 **15 Claims**



1. A process for producing an aqueous suspension of nitrifying bacteria, in which the bacteria remain metabolically and physiologically active under the induction of specific nitrification enzyme systems, can be kept for long periods in the absence of oxygen at a stationary growth phase and can be finally used, comprising a growth medium containing ammonia or nitrite, and separate compartments having a higher or lower oxygen partial pressure created in a sealed culture flask.

4,874,708

PROCESS FOR THE PREPARATION OF INTRA-VENOUSLY ADMINISTERED GAMMA-GLOBULINS AND THE GAMMA-GLOBULINS OBTAINED

Marie-France Makula, La Cerisaie, 18D rue de Tourvielle, 69 005 Lyon, and Jacques Liautaud, Le Petit Paris, 69 760 Limonest, both of France

PCT No. PCT/FR86/00184, § 371 Date Jan. 23, 1987, § 102(e) Date Jan. 23, 1987, PCT Pub. No. WO86/06963, PCT Pub. Date Dec. 4, 1986

PCT Filed May 30, 1986, Ser. No. 12,662

Claims priority, application France, May 30, 1985, 85 08094

Int. Cl.[4] C07K *3/12*

U.S. Cl. 435—272 11 Claims

1. A process for the production of gamma-globulins free of aggregates, dimers and kallikrein and administratable intravenously, comprising subjecting a fraction rich in gamma-globulins to fractionation with polyethylene-glycol (PEG) and to a step of controlled enzymatic treatment with an enzyme selected from the group consisting of pepsins, plasmins and papains, said enzymatic treatment being conducted at a suitable pH and in a manner that avoids appreciable proteolysis.

4,874,709

SOLVENT AND METHOD FOR THE KARL-FISCHER DETERMINATION OF WATER

Wolfgang Fischer, Darmstadt, and Karl D. Krenn, Pfungstadt, both of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit Beschränkter Haftung, Darmstadt, Fed. Rep. of Germany

Filed Jul. 12, 1988, Ser. No. 217,912

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1987, 3723084

Int. Cl.[4] G01N *33/18*

U.S. Cl. 436—42 19 Claims

1. A method for determining the water content of a sample using a Karl-Fischer titration comprising conducting the Karl-Fischer titration using a Karl-Fischer solvent system containing at least one higher alcohol which is an aliphatic alcohol containing 8 to 12 carbon atoms.

4,874,710

ASSAY AND PRODUCT IN WHICH BINDER AND LIPOSOMES ARE SUPPORTED ON A SOLID SUPPORT

Uri Piran, Norwood, Mass., assignor to Becton Dickinson and Company, Franklin Lakes, N.J.

Filed Feb. 20, 1986, Ser. No. 831,410

Int. Cl.[4] G01N *33/53, 33/566, 33/543, 33/537*

U.S. Cl. 436—518 16 Claims

1. An assay for an analyte, comprising:

contacting an analyte with a binder for at least the analyte in the presence of a conjugate, said conjugate comprising a ligand coupled to a liposome lysing agent; said ligand portion of the conjugate being bound by one of the analyte and binder, whereby a portion of the conjugate is bound to the binder; contacting unbound conjugate with liposomes which include in the interior thereof a detectable marker, said binder and liposomes being supported on separate portions of a solid support, said contacting lysing the liposomes; and determining marker released from the liposomes by contact with the liposome lysing agent of the unbound conjugate as a measure of analyte.

4,874,711

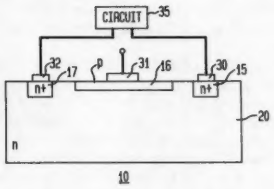
METHOD FOR ALTERING CHARACTERISTICS OF ACTIVE SEMICONDUCTOR DEVICES

David W. Hughes, Chamblee; Robert K. Feeney, Doraville, and David R. Hertling, Stone Mountain, all of Ga., assignors to Georgia Tech Research Corporation, Atlanta, Ga.

Continuation-in-part of Ser. No. 53,474, May 26, 1987, abandoned. This application Jan. 19, 1988, Ser. No. 145,623

Int. Cl.[4] H01L *21/326, 21/66*

U.S. Cl. 437—8 16 Claims



1. A method for altering an electrical characteristic of a circuit having at least one active semiconductor device and at least one electrode contacted to the active semiconductor device, the method comprising the step of applying at least one electrical pulse to the active semiconductor device, including applying the pulse to at least one of the at least one electrode, the pulse having sufficient amplitude of one or more of its electrical parameters and time duration to alter the electrical characteristics of the device, and, thereby, to alter the electrical characteristic of the circuit, the amplitudes of the electrical parameters and the time duration of the at least one pulse being sufficient to form dendrites or filaments of material from the at least one electrode in the active semiconductor device wherein the dendrites or filaments are not of a geometry to cause a short to be formed between any pair of electrodes of the active semiconductor device and wherein, after the steps of applying the method have been completed, no short has been formed thereby between any pair of electrodes of the circuit.

4,874,712

FABRICATION METHOD OF BIPOLAR TRANSISTOR

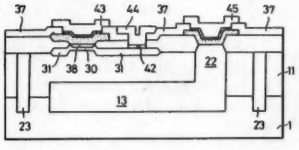
Myung S. Kim, Seoul; Hyun S. Kang, Suweon; Soon K. Lim, and Hee K. Park, both of Bucheon, all of Rep. of Korea, assignors to Samsung Semiconductor & Telecommunication Co., Ltd., Gumi City, Rep. of Korea

Filed Sep. 26, 1988, Ser. No. 249,401

Claims priority, application Rep. of Korea, Sep. 26, 1987, 87-10713

Int. Cl.[4] H01L *21/225*

U.S. Cl. 437—31 2 Claims



1. The fabrication method of the bipolar transistor characterized by the thing that the formation method of the base and the emitter region is made up with the process mentioned below in the fabrication method of the bipolar transistor which is fully equipped with the collector region of the 1st conduction type on the silicon substrate of the 1st conduction type and the base region of the 2nd conduction type in the collector region and the emitter region of the 1st conduction type in the base region:

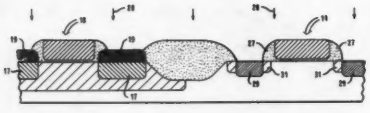
a. the process in which ions of the 2nd conduction type are implanted into the region where the said base is to be formed to form the 1st base region,
b. the process in which the nitride layer and the oxide layer for the masking are formed sequentially on the surface of the substrate, and the oxide and the nitride layer of the remaining region except for the region, where the emitter is to be formed, are etched to form the masking layer,
c. the process in which ions of the 2nd conduction type are implanted into the region, where the base is to be formed, with the higher dose than that of the ion implantation of the said process by using the masking layer of the region, where the said emitter is to be formed, as the mask to form the 2nd base region,
d. the process in which the side walls of the nitride layer for the masking are etched to define the emitter region,
e. the process in which, after the oxide layer for the masking is removed and the annealing is proceeded to activate the ion-implanted region in the process c, a specified oxide layer is formed by using the nitride layer as the mask,
f. the process in which the nitride layer is removed and the window is formed on the region, where the emitter is to be formed, and the collector contact region,
g. the process in which the polycrystalline silicon layer is formed on the surface of the substrate and ions of the 1st conduction type are implanted into the polycrystalline silicon layer,
h. the process in which the doped polycrystalline silicon layer is etched to form the polycrystalline silicon emitter contact and the polycrystalline silicon collector contact,
i. the process in which the oxide layer, which is the protection layer, is formed on the surface of the substrate and the heat treatment for the formation of the emitter region is proceeded,
j. the process in which the window is formed for the electrode contacts of the emitter, the base and the collector region,
k. and the process in which metal is connected to the conductor layer through the window.

4,874,713

METHOD OF MAKING ASYMMETRICALLY OPTIMIZED CMOS FIELD EFFECT TRANSISTORS

Samuel C. Gioia, Colorado Springs, Colo., assignor to NCR Corporation, Dayton, Ohio

Filed May 1, 1989, Ser. No. 345,875
Int. Cl.[4] H01L *21/265*
U.S. Cl. 437—34 **11 Claims**



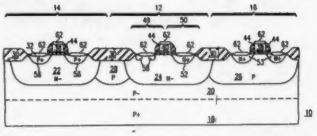
1. A process for forming CMOS field effect transistor integrated circuits, comprising the steps of:
forming in an active region of a semiconductor substrate first and second polysilicon gate electrodes with underlying gate dielectrics;
forming a capping dielectric layer over the first and second polysilicon gate electrodes;
forming a photolithographic mask over the second polysilicon gate electrode and associated field effect transistor source/drain regions;
doping the substrate in the presence of the photolithographic mask to form source/drain regions in the semiconductor substrate aligned to the first polysilicon gate electrode;
selectively forming metallic regions over the source/drain regions of the first polysilicon gate electrode;
thereafter lightly doping source/drain regions of the second polysilicon gate electrode in alignment with the second polysilicon gate electrode using said metallic regions as a mask;
forming a sidewall dielectric for the second polysilicon gate electrode; and
heavily doping the source/drain region of the second polysilicon gate electrode in alignment with the sidewall dielectric.

4,874,714

METHOD OF MAKING LATERALLY ORIENTED SCHOTTKY DIODE

Robert H. Eklund, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 2, 1988, Ser. No. 201,506
Int. Cl.[4] H01L *21/22, 21/265*
U.S. Cl. 437—39 **12 Claims**



1. A method of manufacturing a metal-semiconductor diode in a substrate having semiconducting surface areas thereon, said method comprising the steps of:
forming a well region in said substrate at one of said surface areas, said well region containing a first conductivity type dopant at a first level of concentration;
forming a spacer on said substrate overlying a portion of said well region;
forming a first mask layer overall;
removing selected portions of said first mask layer to expose a first edge of said spacer and a portion of the well region adjacent to said first edge of said spacer;
forming an ohmic contact region in said portion of said well region exposed by said first mask layer, said ohmic contact region containing a first conductivity type dopant at a second level of concentration, said second level of concentration being greater than said first level of concentration;
forming a metallic layer overlying and in contact with a portion of said well region adjacent to a second side of said spacer, said second side opposing said first side, a boundary between said metallic layer and said well region being a rectifying junction.

4,874,715

READ ONLY MEMORY WITH IMPROVED CHANNEL LENGTH CONTROL AND METHOD OF FORMING

James L. Paterson, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 54,113, May 20, 1987, Pat. No. 4,763,177, which is a continuation of Ser. No. 702,562, Feb. 19, 1985, abandoned. This application Jun. 10, 1988, Ser. No. 206,410
Int. Cl.[4] H01L *29/96*
U.S. Cl. 437—43 **22 Claims**

1. A method of making a semiconductor device comprising:
doping a region at face of a semiconductor body with a conductivity-type determining impurity,
forming a layer of insulator material over said doped region,
forming first and second trenches extending through said insulator layer and said doped region into said semiconductor body, a portion of said doped region extending contiguously from said first trench to said second trench,
forming a gate insulating layer covering said first and second trenches,
forming a layer of conductive material over said trenches to form first and second floating gates therein, respectively,

forming a third insulating layer over said first and second floating gates, and

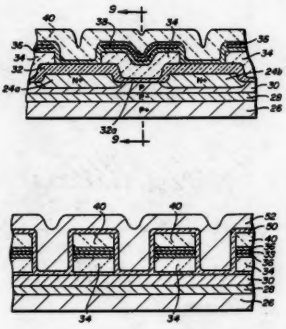
forming a second conductive layer over said third insulating layer and contiguous over said first and second floating gates.

12. A method of making a floating gate semiconductor memory in the form of an array of rows and columns of memory cells comprising the steps of:

forming a doped region over a portion of a face of a semiconductor body at which said array is to be formed,

forming a layer of oxide over said doped region,

forming spaced apart elongated trenches extending through



said oxide and doped region into said semiconductor body thereunder, to divide said doped region into columns between said trenches,

forming a first gate insulating layer covering said trenches,

forming polycrystalline silicon floating gates overlying spaced apart locations of said trenches, those floating gates which overlie a common trench defining a column of memory cells,

forming a second gate insulating layer over said floating gates, and

forming strips of polycrystalline silicon, each strip overlying a plurality of said floating gates in a plurality of columns to define a row of memory cells.

4,874,716

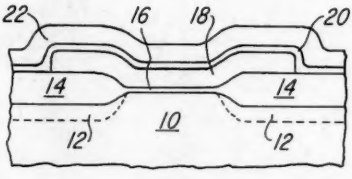
PROCESS FOR FABRICATING INTEGRATED CIRCUIT STRUCTURE WITH EXTREMELY SMOOTH POLYSILICONE DIELECTRIC INTERFACE

Kalipatnam V. Rao, Plano, Tex., assignor to Texas Instrument Incorporated, Dallas, Tex.

Division of Ser. No. 846,683, Apr. 1, 1986, abandoned. This application Jan. 22, 1988, Ser. No. 146,936

Int. Cl.[4] H01L *21/263*

U.S. Cl. 437—43 **17 Claims**



1. A process for fabricating an integrated circuit structure on a substrate, comprising:

depositing a conductive layer of amorphous silicon on said substrate;

depositing a dielectric layer on said conductive layer of amorphous silicon in such a manner as to define an interface between said dielectric layer and said conductive layer of amorphous silicon of extreme smoothness having a roughness factor measured by a maximum local excursion in either direction normal to said interface no greater than 60 angstroms; and

crystallizing said conductive layer of amorphous silicon to form polycrystalline silicon as said conductive layer, while maintaining the smoothness of said interface between said dielectric layer and said conductive layer of polycrystalline silicon with a roughness factor measured by a maximum local excursion in either direction normal to said interface no greater than 60 angstroms.

4,874,717

SEMICONDUCTOR CIRCUIT CONTAINING INTEGRATED BIPOLAR AND MOS TRANSISTORS ON A CHIP AND METHOD OF PRODUCING SAME

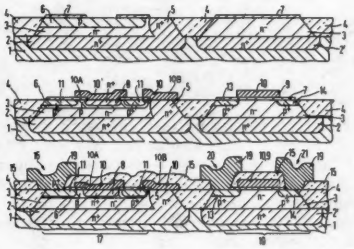
Franz Neppl, and Ulrich Schwabe, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Division of Ser. No. 502,511, Jun. 9, 1919, abandoned. This application Nov. 2, 1988, Ser. No. 265,948

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1982, 3230077

Int. Cl.[4] H01L *21/265*

U.S. Cl. 437—59 **11 Claims**



1. A method for producing an integrated semiconductor circuit having at least one npn bipolar transistor and at least one p-channel MOS field effect transistor in a p-doped silicon substrate, comprising steps of:

(a) defining an active region of said circuit by producing first and second n^+-doped zones spaced from one another in the substrate by masked ion implantation;

(b) applying an epitaxial n^--doped layer on the first and second n^+-doped zones;

(c) etching an insulation trough in a region between the n^+-doped zones;

(d) providing an insulating oxide in the insulation trough;

(e) by use of a mask providing an n^+ deep diffusion through the epitaxial n^--doped layer to the first n^+-doped zone, said first n^+-doped zone serving as a collector region of the bipolar transistor;

(f) removing the mask for the deep diffusion, and applying another mask for a base implantation in the bipolar transistor, and then generating a base zone with p-doping ions in the bipolar transistor;

(g) applying an oxide layer on the surface of the substrate and with a photo-lithographic process defining an emitter zone by removing a portion of the oxide layer above the base zone and defining an opening for a collector contact by removing a portion of the oxide layer above the n^+ deep diffusion zone;

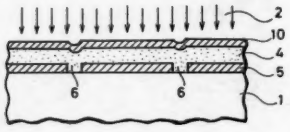
(h) generating the emitter zone by ion implantation and diffusion of n-doping ions;
(i) depositing a surface-wide silicide layer and structuring the silicide layer by a photolithographic process to define an emitter zone contact and collector zone contact for the bipolar transistor and a gate electrode for the MOS transistor;
(j) using the structured silicide layer as an implantation mask for a base contact region implantation and for generation of source and drain zones in the MOS transistor;
(k) annealing the structured silicide layer;
(l) applying an insulation layer as an intermediate oxide;
(m) etching contact hole regions through the insulation layer for a base contact and source and drain contacts; and
(n) providing a metallization structuring of an outer metal interconnect level so as to form said base contact, source contact, and drain contact.

4,874,718

METHOD FOR FORMING SOI FILM

Yasuo Inoue, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 28, 1988, Ser. No. 225,462
Claims priority, application Japan, Jul. 28, 1987, 62-189377
Int. Cl.[4] H01L *21/76*
U.S. Cl. 437—62 **12 Claims**



1. An SOI film forming method for forming by solid phase epitaxial growth an SOI film formed of a monocrystalline silicon film isolated from a monocrystalline silicon layer through an oxide film on said monocrystalline silicon layer, comprising the steps of:
forming an oxide film having a through hole portion on said monocrystalline silicon layer,
forming an amorphous layer on the surface of said oxide film and inside said through hole portion,
forming the monocrystalline silicon film by epitaxially growing said amorphous layer with a surface region of said monocrystalline silicon layer positioned in said through hole portion as a nucleus, and
forming an oxide layer in said through hole portion provided in said oxide film.

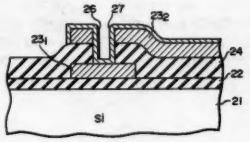
4,874,719

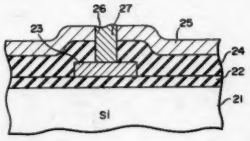
METHOD FOR MANUFACTURING AN ELECTRICAL CONNECTION BETWEEN CONDUCTOR LEVELS

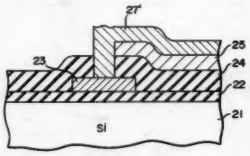
Kei Kurosawa, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 44,208, Apr. 30, 1987, abandoned. This application Jul. 18, 1988, Ser. No. 221,008
Claims priority, application Japan, May 6, 1986, 61-103413
Int. Cl.[4] H01L *21/283, 21/31*
U.S. Cl. 437—195 **9 Claims**

1. A method for manufacturing a semiconductor device, comprising the steps of:
(a) forming a first conductive pattern;
(b) forming an insulation interlayer so that it covers the first conductive pattern;
(c) forming, on the insulation interlayer, a conductive film on which a second conductive pattern is formed;
(d) forming a contact hole, at a predetermined location, in both said conductive film and said insulation interlayer, so that said contact hole reaches said first conductive pattern;
(e) forming a conductive layer for both covering the interior of the contact hole and directly covering the upper surface of the conductive film, so that a wiring is made between the conductive film and the first conductive pattern; and







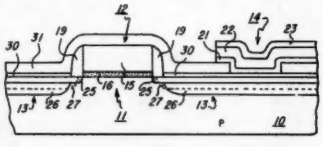
(f) subsequent to the formation of said conductive layer by step (e), selectively etching said conductive film and said conductive layer, to form the second conductive pattern.

4,874,720

METHOD OF MAKING A METAL-GATE MOS VLSI DEVICE

James M. McDavid, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 624,166, Jun. 25, 1984, Pat. No. 4,736,233. This application Dec. 21, 1987, Ser. No. 136,043
Int. Cl.[4] H01L *21/265, 3/00*
U.S. Cl. 437—203 **9 Claims**



1. A method of making a gate, a contact and interconnect structure in a process for manufacture of MOS integrated circuits, comprising the steps of:
forming a metal gate on a face of a silicon body by applying

a layer of tungsten overlying and adhered to a thin layer of silicon oxide on said face, and applying a coating of oxide on the sidewalls of said gate;

forming heavily-doped source/drain regions in said face, said source/drain regions being self-aligned with said oxide on the sidewalls of the metal gate,

forming selectively a tungsten metal layer on the surface of said source/drain regions self-aligned with said oxide on the sidewalls of the metal gate,

forming a thick deposited insulator coating on said face over said metal gate and over said tungsten metal layer and source/drain regions,

applying a metal contact and interconnect strip extending along said face overlying said insulator coating and extending into a contact hole in said insulator coating to make electrical connection to said tungsten metal layer, including: first applying a layer of molybdenum over said tungsten layer in said contact hole and over said insulator coating, and thereafter applying a thicker layer of tungsten over said molybdenum and a layer of gold over said thicker layer of tungsten.

6. A method of making a gate, contact and interconnect structure in a process for manufacture of MOS integrated circuits, comprising the steps of:

forming a metal gate on a face of a silicon body by applying a layer of tungsten overlying and adhered to a thin layer of silicon oxide on said face, and applying a coating of oxide on the sidewalls of said gate;

forming heavily-doped source/drain regions in said face, said source/drain regions being self-aligned with said oxide on the sidewalls of the metal gate,

forming selectively a tungsten metal layer on the surface of said source/drain regions self-aligned with said oxide on the sidewalls of the metal gate,

forming a thick deposited insulaator coating on said face over said metal gate and over said tungsten metal layer and source/drains regions,

applying a metal contact and interconnect strip extending along said face overlying said insulator coating and extending into a contact hole in said insulator coating to make electrical connection to said tungsten metal layer.

4,874,721

METHOD OF MANUFACTURING A MULTICHIP PACKAGE WITH INCREASED ADHESIVE STRENGTH

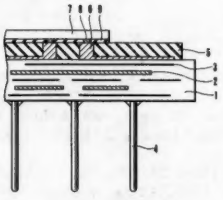
Mitsuru Kimura, and Shoji Nakakita, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Division of Ser. No. 180,697, Apr. 8, 1988, abandoned, which is a continuation of Ser. No. 928,559, Nov. 10, 1986, abandoned. This application Oct. 18, 1988, Ser. No. 259,319

Claims priority, application Japan, Nov. 11, 1985, 60-250.652; Nov. 11, 1985, 60-250653; Nov. 22, 1985, 60-261483

Int. Cl.[4] H01L *21/60*

U.S. Cl. 437—209 **2 Claims**



1. A method for manufacturing a multichip package comprising the steps of:

forming a first polyimide insulating layer on a surface of a ceramic multilayer substrate having a circuit wiring therein;

forming a first wiring connected to said circuit wiring of said multilayer substrate with a part of said first wiring being exposed at an open surface of said first polyimide insulating layer;

forming a second polyimide insulating layer on a surface of a semiconductor element;

forming a second wiring connected with a circuit wiring of said semiconductor element in said second polyimide insulating layer with a part of said second wiring being exposed at an open surface of said second polyimide insulating layer;

positioning said semiconductor element on said substrate such that said part of said first wiring and said part of said second wiring oppose to each other; and

applying a predetermined pressure and a predetermined temperature in a predetermined gas atmosphere for a predetermined time period to cause said first and second polyimide insulating layers to be cured and bonded with each other and to cause the parts of said first and second wiring to be connected to each other by thermocompression bonding.

4,874,722

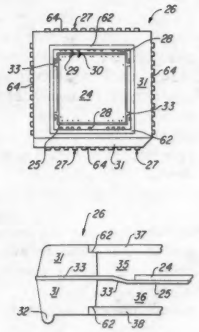
PROCESS OF PACKAGING A SEMICONDUCTOR DEVICE WITH REDUCED STRESS FORCES

George A. Bednarz, Plano; Reginald W. Smith, Arlington; Gretchen W. Roeding, Carrollton, and Howard R. Test, Plano, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 40,449, Apr. 16, 1987, abandoned. This application Apr. 28, 1988, Ser. No. 188,185

Int. Cl.[4] H01L *25/02*

U.S. Cl. 437—209 **8 Claims**



1. A method of producing a cavity package semiconductor device, comprising the steps of:

(a) providing a bar pad having a plurality of bar pad straps, each said bar pad strap extending outwardly from the outer edge of said bar pad and spaced about the edge of said bar pad;

(b) mounting a integrated circuit having bond pads thereon on said bar pad;

(c) providing a plurality of lead fingers;

(d) molding a package material ring onto a central portion of each said lead fingers and said bar pad straps to grip and surround each said lead finger with said package material, with a portion of each said lead finger extending externally of said ring at both the exterior and interior thereof and to secure said bar pad straps therein;

(e) electrically coupling said bond pads to the portion of predetermined ones of said lead fingers extending toward the interior of said ring; and

(f) enclosing both ends of said ring to provide a cavity in said

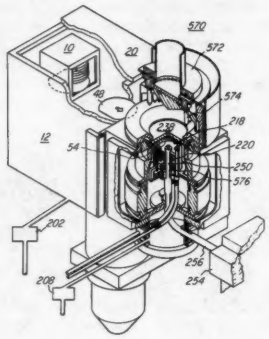
ring to suspend said bar pad with integrated circuit thereon within said cavity with said bar pad straps.

4,874,723

SELECTIVE ETCHING OF TUNGSTEN BY REMOTE AND IN SITU PLASMA GENERATION

Rhett B. Jucha, Celeste; Duane E. Carter, Plano; Cecil J. Davis, Greenville, and Sue E. Crank, Coppell, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jul. 16, 1987, Ser. No. 74,375
Int. Cl.[4] H01L *21/306*
U.S. Cl. 437—245 **17 Claims**



1. A method for etching tungsten on a wafer comprising:
(a) transferring a wafer into a vacuum processing chamber;
(b) applying a pressure to said chamber less than ambient to maintain said chamber at less than ambient;
(c) providing a sulfur containing fluorine gas to a remote plasma chamber separated from said chamber and producing a remote plasma;
(d) providing a carbon containing fluorine gas to said remote plasma chamber separated from said chamber and producing a remote plasma;
(e) adding a bromine containing gas to said remote plasma chamber; and
(f) applying a radio frequency signal across two electrodes one of which is adjacent to the wafer and causing a plasma to be formed whose dark space is in the vicinity of the surface of the slice;
(g) flowing the gas mixture over said wafer disposed within said chamber.

4,874,724

ALKALI ZINC ALUMINOPHOSPHATE GLASS-CERAMICS

George H. Beall, Big Flats; Joseph E. Pierson, Painted Post, and Candace J. Quinn, Corning, all of N.Y., assignors to Corning Incorporated, Corning, N.Y.

Filed Oct. 17, 1988, Ser. No. 258,673
Int. Cl.[4] C03C *10/02, 3/17, 3/21*
U.S. Cl. 501—10 **4 Claims**

1. A glass-ceramic exhibiting an apparent annealing point greater than 400° C. and excellent resistance to moisture attack, said glass-ceramic consisting essentially, expressed in terms of mole percent on the oxide basis, of:

Li_2O	5–25	ZnO	35–50
Na_2O	0–15	Al_2O_3	0.75–6
K_2O	0–10	P_2O_5	29–37.
$Li_2O + Na_2O + K_2O$	5–25		

4,874,725

HIGH-DENSITY SINTERED ARTICLE OF SILICON CARBID

Mitsuhiko Furukawa; Takashi Kitahira; Sakae Tanaka, and Kiyohito Misumi, all of Fukuoka, Japan, assignors to Nippon Tungsten Co., Ltd., Fukuoka, Japan

Continuation of Ser. No. 912,162, Sep. 24, 1986, abandoned, which is a continuation of Ser. No. 748,652, Jun. 25, 1985, abandoned. This application Dec. 4, 1987, Ser. No. 129,856
The portion of the term of this patent subsequent to Aug. 22, 2006, has been disclaimed.
Int. Cl.[4] C04B *35/56*
U.S. Cl. 501—89 **11 Claims**

1. A high-density sintered article for use as a structural material which is exposed to elevated temperatures, comprising silicon carbide and a composite oxide, said composite oxide consisting essentially of erbium oxide and aluminum oxide, said composite oxide being in the form of a powder obtained by grinding a garnet synthesized from said erbium oxide and said aluminum oxide, said silicon carbide and composite oxide being mixed to form a mixture to be sintered to form said article, the amount of said erbium oxide being 2 to 12% and the amount of said aluminum oxide being more than 0% and up to 2%, said percentages being percentages by weight of said mixture, the size of the pores of the article not exceeding 1.0 μm, the size of the crystal grains of the article not exceeding 5 μm, and the relative density of said article not being less than 98.8%.

6. A method of making a high-density sintered article for use as a structural material which is exposed to elevated temperatures, comprising mixing erbium oxide and aluminum oxide to form a mixture thereof, heating said mixture to synthesize a garnet, grinding said garnet to form a powder, mixing said powder with silicon carbide to form a composition containing 2 to 12% erbium oxide and more than 0% and up to 2% aluminum oxide, and sintering said composition to form said sintered article, said percentages being percentages by weight of said composition, the size of the pores of the article not exceeding 1.0 μm, the size of the crystal grains of the article not exceeding 5 μm, and the relative density of said article not being less than 98.8%.

4,874,726

LIGHTWEIGHT FUSED SILICA REFRACTORY COMPOSITIONS

Thomas R. Kleeb, Pittsburgh, and Berhl E. Wishon, Bethel Park, both of Pa., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Nov. 18, 1987, Ser. No. 121,951
Int. Cl.[4] C04B *33/14, 35/10, 38/08*
U.S. Cl. 501—124 **4 Claims**

1. A refractory composition consisting essentially of a fused silica composition containing about 40 to 95 weight percent vitreous silica, up to about 25 weight percent of a calcined refractory aggregate, and the balance a calcium aluminate cement; and for each 100 parts by weight of said fused silica composition from about 3 to 15 parts by weight of alumina-silica based hollow microspheres.

4,874,727

PARTICULATE LEAD TITANATE CERAMIC AND COMPOSITE MATERIAL CONTAINING SAME

Kanji Ohya; Tsutomu Tsunooka; Koji Ogura; Hirofumi Ozeki, and Takashi Yamamoto, all of Nagoya, Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan

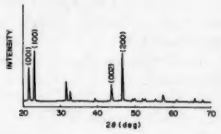
Filed Aug. 20, 1987, Ser. No. 87,658

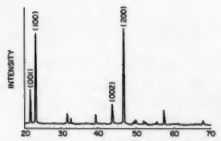
Claims priority, application Japan, Aug. 29, 1986, 61-204199

The portion of the term of this patent subsequent to May 10, 2005, has been disclaimed.

Int. Cl.[4] C04B *35/46*

U.S. Cl. 501—134 17 Claims





1. A dielectric particulate lead ceramic composition consisting essentially of rectangular parallelepiped particles having the formula $Pb_{1+x}TiO_{3+x}$, wherein x is from 0.01 to 0.08.

4,874,728

ORGANOPHILIC CLAY MODIFIED WITH SILANE COMPOUNDS

Donald R. Eilliott, Louisville, and Gary W. Beall, Fairfield, both of Ky., assignors to United Catalyst Inc., Louisville, Ky.

Continuation-in-part of Ser. No. 50,473, Mar. 26, 1987, abandoned, which is a continuation-in-part of Ser. No. 796,867, Nov. 12, 1985, abandoned. This application Mar. 21, 1988, Ser. No. 171,424

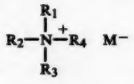
Int. Cl.[4] C04B *33/04*

U.S. Cl. 501—148 14 Claims

1. An organophilic clay dry powder comprising the reaction product of

(a) a smectite type clay having a cation exchange capacity of at least about 75 milliequivalents per 100 grams of clay on a 100 percent active basis;

(b) a quaternary ammonium compound having the structure



wherein R_1 is an alkyl group having about 12 to about 22 carbon atoms, wherein R_2, R_3 and R_4 are alkyl groups containing 1 to about 22 carbon atoms, aryl groups and arylalkyl groups containing 7 to about 22 carbon atoms and wherein M is chloride, bromide, iodide, nitrate, nitrite, sulfate, hydroxide or C_1 to C_{18} carboxylate; and

(c) an organosilane having the formula:

$$R_n Si X_{(4-n)}$$

wherein n is an integer of 1 to 3, wherein R is an organic radical having a carbon atom directly linked to the silicon atom and wherein X is alkoxy, acryloxy, amino or halogen.

4,874,729

PROCESS FOR THE PREPARATION OF MODIFIED ZEOLITES

Aan H. Klazinga, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 12, 1988, Ser. No. 180,748

Claims priority, application United Kingdom, Apr. 14, 1987, 8708961

Int. Cl.[4] B01J *29/08*

U.S. Cl. 502—61 18 Claims

1. A process for the preparation of a modified zeolite by treatment with a solution of one or more metal salts and a calcination which process comprises treating a zeolite having an alkali oxide/aluminium oxide molar ratio between about 0.13 and about 1.0 with a solution of a salt of a multi-valent metal-ion having an atomic number of from about 12 to about 83 and converting it by calcination into a product having a unit cell size between about 24.21 Å and 24.60 Å.

6. The process of claim 1 wherein said solution of one or more metal salts contains a metal having a valency of 2, 3 or mixtures thereof.

7. The process of claim 6 wherein said metal salt is selected from the group consisting of magnesium, aluminum, gallium, iron, copper, nickel, manganese, cobalt, zinc and mixtures thereof.

15. A catalytically active composition which comprises a modified zeolite having a unit cell size of between about 24.21 Å and about 24.40 Å prepared by the process of claim 1.

16. The catalytically active composition of claim 15 wherein said composition further comprises at least one hydrogenation component of a Group VI metal, at least one hydrogenation component of a Group VIII metal or mixture thereof.

4,874,730

PROCESS FOR THE PREPARATION OF MODIFIED ZEOLITES

Aan Hendrik Klazinga, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 12, 1988, Ser. No. 180,747

Claims priority, application United Kingdom, Apr. 14, 1987, 8708962

Int. Cl.[4] B01J *29/08*

U.S. Cl. 502—61 17 Claims

1. A process for the preparation of a modified Y zeolite by treatment with a solution of a metal salt and a calcination which comprises treating a Y zeolite having an alkali oxide/aluminum oxide molar ratio not greater than about 0.13 with a solution of a multi-valent metal salt having a cationic radius between about 0.6 and about 1.0 Å and converting it by calcination into a product having a unit cell size between about 24.21 Å and about 24.65 Å.

3. The process of claim 1 wherein said solution of said multi-valent metal ion has a cationic radius between about 0.60 Å and about 0.80 Å.

4. The process of claim 3 wherein said multi-valent metal salt is selected from the group consisting of gallium, iron, copper, magnesium, cobalt, nickel and mixtures thereof.

14. A catalytically active composition comprising a zeolite having a unit cell size about 24.21 Å and about 24.40 Å prepared by the process of claim 1, and a binder.

15. The composition of claim 14 wherein said composition additionally contains at least one hydrogenation component of a Group VI metal, at least one hydrogenation component of a Group VIII metal or mixtures thereof.

4,874,731

CATALYST FOR THE ISOMERIZATION OF AROMATICS

J. W. Adriaan Sachtler, Des Plaines, and R. Joe Lawson, Palatine, both of Ill., assignors to UOP, Des Plaines, Ill.

Filed Oct. 13, 1987, Ser. No. 107,604
Int. Cl.[4] B01J *29/32, 29/36*
U.S. Cl. 502—66 8 Claims

1. An isomerization catalyst useful for the isomerization of C_8 aromatics and conversion of ethylbenzene comprising 2 to 60 wt. % of a pentasil zeolite, 0.05 to 3 wt. % platinum, 0.1 to 2 wt. % bismuth, and an alumina binder.

4,874,732

COBALT FISCHER-TROPSCH CATALYSTS HAVING IMPROVED SELECTIVITY

James G. Miller, Pearl River, and Jule A. Rabo, Armonk, both of N.Y., assignors to UOP, Des Plaines, Ill.

Filed Jul. 13, 1987, Ser. No. 72,747
Int. Cl.[4] B01J *29/10*
U.S. Cl. 502—74 5 Claims

1. A cobalt Fischer Tropsch catalyst supported by an ultrahydrophobic molecular sieve in combination with an effective amount of a promoter selected from the group comprising Mn oxide and the combination of Mn oxide and Zr oxide.

4,874,733

COBALT FISCHER-TROPSCH CATALYSTS HAVING IMPROVED SELECTIVITY

James G. Miller, Pearl River, and Jule A. Rabo, Armonk, both of N.Y., assignors to UOP, Des Plaines, Ill.

Filed Jul. 13, 1987, Ser. No. 72,748
Int. Cl.[4] B01J *29/14*
U.S. Cl. 502—74 3 Claims

1. A cobalt Fischer-Tropsch catalyst supported by a steam treated, acid extracted LZ-210 molecular sieve.

4,874,734

PROCESS FOR PRODUCING SOLID CATALYST FOR POLYMERIZATION OF OLEFINS

Mamoru Kioka, and Norio Kashiwa, both of Iwakuni, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Mar. 29, 1988, Ser. No. 174,967
Claims priority, application Japan, Apr. 3, 1987, 62-81287
Int. Cl.[4] C08F *4/64*
U.S. Cl. 502—104 34 Claims

1. A process for producing a solid catalyst for polymerization of olefins, which comprises bringing a solution of an aluminoxane into contact with a suspension of a particulate carrier having supported thereon a compound of a transition metal of Group IVB of the periodic table in a solvent in which the aluminoxane is insoluble or sparingly soluble.

4,874,735

BILAYER ELECTRONICALLY CONDUCTIVE POLYMERS AND PROCESS FOR THEIR PRODUCTION

R. N. O'Brien, Victoria, Canada, and K. S. V. Santhanam, Bombay, India, assignors to University of Victoria, Canada

Filed Jun. 22, 1987, Ser. No. 64,468
Claims priority, application Canada, Feb. 27, 1987, 530,773
Int. Cl.[4] B01J *31/06*
U.S. Cl. 502—159 16 Claims

9. An article comprising: a bilayer, electronically-conductive film comprising an outer film of a polycarbazole and a base film of a polypyrrole, said bilayer film having been stripped from an electrode on which a coherent coating, consisting of said bilayer film had previously been applied, the polypyrrole component of said bilayer film having previously been in contact with said electrode.

4,874,736

CATALYST COMPOSITIONS AND PROCESSES FOR POLYMERIZING CARBON MONOXIDE AND OLEFINICALLY UNSATURATED HYDROCARBONS

Eit Drent, CM Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

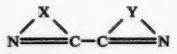
Division of Ser. No. 940,876, Dec. 10, 1986, Pat. No. 4,788,279.
This application Sep. 23, 1988, Ser. No. 248,067
Claims priority, application Netherlands, Dec. 10, 1985, 8503395
Int. Cl.[4] C08F *4/10, 4/20, 4/22, 4/26*
U.S. Cl. 502—165 11 Claims

1. A catalyst composition which comprises

(1) a compound of a Group VIII metal selected from the group consisting of palladium, cobalt and nickel, said compound being a salt of a carboxylic acid,

(2) a metal salt having an anion of a non-hydrohalogenic acid with a pKa less than 6, wherein the metal is selected from the group consisting of nickel, copper, iron, cobalt, chromium, manganese and vanadium,

(3) a nitrogen bidentate ligand of the general formula



wherein X and Y represent similar or different organic bridging groups, each bridging group having a bridge containing three or four atoms, wherein at least two of the atoms in the bridge are carbon atoms, and

(4) an organic oxidant selected from the group consisting of unsubstituted 1,4-benzoquinones, 1,4-benzoquinones substituted with one or more groups selected from chloro, methyl, hydroxy or nitro groups, alkyl nitrites, and aromatic nitro compounds, said aromatic nitro compounds being selected from nitrobenzene, nitrotoluene or nitrochlorobenzene.

4,874,737

SILICATE-MODIFIED MAGNESIUM ALKOXIDE POLYMERIZATION CATALYSTS

Robert C. Job, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Sep. 6, 1988, Ser. No. 240,298
Int. Cl.[4] C08F *4/64*
U.S. Cl. 502—171 7 Claims

1. A process for improving the productivity of a polymerization catalyst formed from a magnesium alkoxide which normally undergoes poor metathesis towards production of magnesium chloride, which comprises treating said magnesium alkoxide with a silane of the formula $R'_mSi(OR)_{4-m}$ where $R=C_nH_{2n+1}$, $n\geqq 2$, $0\leqq m<4$ and R' may be an aryl or alkyl, wherein an alcohol may be formed and become bound to the alkoxide, at or above the temperature at which the alcohol formed would dissociate from the alkoxide prior to subjecting said magnesium alkoxide to metathesis.

4,874,738

CATALYST FOR AMMOXIDATION OF PARAFFINS

James F. Brazdil, Jr., Mayfield Village; Linda C. Glaeser, Lyndhurst, and Mark A. Toft, Lakewood, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Sep. 9, 1988, Ser. No. 242,236
Int. Cl.[4] B01J *27/16, 27/18, 27/188, 27/198*
U.S. Cl. 502—209 4 Claims

1. A complex metal oxide catalyst composition that has 0–99 weight percent of a diluent/support and 100–1 weight percent of a catalyst having the elements and the proportions indicated by the empirical formula:

$$VP_pW_wA_aD_dC_cT_tO_x \qquad \text{(formula 1)}$$

where

A is one or more of Sn, Mo, B and Ge;

D is one or more of Fe, Co, Ni, Cr, Pb, Mn, Zn, Se, Te, Ga, Zr, In and As;

C is one or more of an alkali metal and Tl;

T is one or more of Ca, Sr, Mg and Ba; and

where a is 0–10; d is 0–10; c is 0–1; t is 0–10; p is 0.1–20; w is 0.2–10; the ratio $(a+c+d+t+w):(1+p)$ is no more than 6; and no more than 2 atoms of Mo are present per atom of V, which catalyst composition is in particulate form and is admixed with a co-catalyst composition also in particulate form and having 0–99 weight percent of a diluent/support and 100–1 weight percent of a co-catalyst having the elements and the proportions indicated by the empirical formula:

$$Bi_nCe_pD_dE_eF_fMo_{12}W_gO_y \qquad \text{(formula 2)}$$

where

D is one or more of Fe, Mn, Pb, Co, Ni, Cu, Sn, P, Cr, Y, Mg, Ca, Sr, Ba and rare earths other than Ce and Sm

E is one or more of Sb, Ge, As, Se, Te and V

F is one or more of an alkali metal, Tl, Ag and Sm and where n is 0.01–24, p is 0.01–24, (n+p) is 0.1–24, d is 0–10, e is 0–10, f is 0–6, g is 0–8, y is determined by the oxidation state of other elements, wherein the weight ratio of said catalyst composition to said co-catalyst composition is in the range of 0.001 to 2.5.

4,874,739

SILVER-CONTAINING CATALYST, PROCESS FOR THE PREPARATION OF THE CATALYST AND THE CATALYST PREPARED BY THE PROCESS

Gosse Boxhoorn, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Jul. 11, 1988, Ser. No. 217,263

Claims priority, application United Kingdom, Jul. 15, 1987, 8716653

Int. Cl.[4] B01J *23/04, 23/14, 23/36, 23/50*

U.S. Cl. 502—218 **30 Claims**

1. A process for the preparation of a silver-containing catalyst suitable for the oxidation of ethylene to ethylene oxide which comprises:

(a) mixing alumina with a tin compound and with an alkali metal compound,

(b) calcining the mixture to obtain an alkali metal-enriched and tin-modified alumina carrier,

(c) impregnating the carrier with a solution of a silver compound, which is sufficient to cause precipitation on the carrier of from 1 to 25 per cent by weight, on the total catalyst, of silver and before, during or after that impregnation also impregnating the carrier with one or more dissolved alkali metal compounds and with a rhenium compound as promoters,

(d) precipitating the silver compound on the carrier and

(e) reducing the silver compound to metallic silver.

4,874,740

THERMOSENSITIVE RECORDING MATERIAL

Shigetoshi Hiraishi, Tokyo; Naomasa Koike, Takasago; Kazuyoshi Kondo, and Mitsuru Fuchigami, both of Tokyo, all of Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

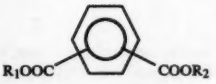
Division of Ser. No. 822,590, Jan. 27, 1986, Pat. No. 4,742,042. This application Feb. 2, 1988, Ser. No. 151,461

Claims priority, application Japan, Jan. 31, 1985, 60-15385; Mar. 4, 1985, 60-43192; Mar. 4, 1985, 60-43193; Mar. 4, 1985, 60-43194; Mar. 4, 1985, 60-43195; Apr. 2, 1985, 60-069691

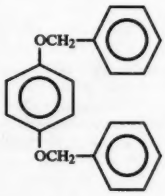
Int. Cl.[4] B41M *5/18*

U.S. Cl. 503—201 **14 Claims**

1. A thermosensitive recording material comprising a support and, provided thereon, a thermosensitive recording layer containing a generally colorless or slightly colored dye precursor and a developer which, upon being heated, reacts with said dye precursor to develop color, wherein said thermosensitive recording layer contains as sensitizer a compound selected from a group consisting of p-benzylbiphenyl, diaryl esters of adipic acid,



(wherein R_1 and R_2 each represents an alkyl, aralkyl, or aryl group), and



and said developer is bis(3-allyl-4-hydroxyphenyl(sulfone or combination of bis(3-allyl-4-hydroxyphenyl)sulfone and 3-allyl-4,4′-dihydroxydiphenylsulfone.

4,874,741

NON-ENHANCED LASER EVAPORATION OF OXIDE SUPERCONDUCTORS

David T. Shaw, East Amherst; Sarath Witanachchi, Buffalo, and Hoi-Sing Kwok, East Amherst, all of N.Y., assignors to The Research Foundation of State University of New York, Albany, N.Y.

Filed Apr. 14, 1988, Ser. No. 181,514

Int. Cl.[4] B05D *3/06, 5/12*

U.S. Cl. 505—1 **9 Claims**

1. A method of depositing a superconducting layer on a substrate which comprises the steps of:

a. forming at least one mixture of a source material for an oxide superconducting layer,

b. evaporating said source material by a laser beam means, and

c. depositing said source material on a substrate under an ionized oxygen atmosphere to directly form an orientated, thin superconducting layer on said substrate.

4,874,742

SYNTHETIC WHOLE BLOOD AND A PROCESS FOR PREPARING THE SAME

Charles S. Ecanow, Skokie, and Bernard Ecanow, Wilmette, both of Ill., assignors to Synthetic Blood Corporation, Deerfield, Ill.

Continuation of Ser. No. 591,774, Mar. 21, 1984, abandoned, which is a continuation of Ser. No. 383,868, Jun. 1, 1982, Pat. No. 4,439,424, which is a continuation of Ser. No. 222,364, Jan. 5, 1981, Pat. No. 4,343,797, which is a continuation-in-part of Ser. No. 146,028, May 2, 1980, abandoned, which is a continuation-in-part of Ser. No. 47,071, Jun. 11, 1979, abandoned. This application Sep. 15, 1987, Ser. No. 96,746

The portion of the term of this patent subsequent to Aug. 10, 1999, has been disclaimed.

Int. Cl.[4] A61K *37/02*

U.S. Cl. 514—2 **19 Claims**

1. A synthetic whole blood substitute, comprising a non-toxic two phase liquid system, both said phases being aqueous, wherein;

one of said phases is an aqueous liquid coacervate phase

(internal suspension phase) which is relatively non-polar and which is capable, when introduced into a body's circulation, of functioning as a substitute for at least part of the erythrocyte portion of whole blood;

the other of said phases is an aqueous liquid external equilibrium phase which is relatively polar and which is capable, when introduced into said circulation, of functioning as a substitute for at least part of the plasma portion of whole blood;

said relatively non-polar coacervate phase is insoluble in and in equilibrium with said relatively polar external equilibrium phase;

said two phase liquid system comprises water, a surface active agent, an electrolyte and albumin in amounts effective for the formation of said two phases, and to obtain osmotic pressure and viscosity similar to that of whole blood;

whereby said two phase liquid system, upon introduction into said circulation, can establish, reestablish and maintain normal osmotic pressures, and can transport and transfer oxygen, carbon dioxide and other physiological gases, and carry nutrients, drugs and various physiological entities in stable form over extended periods of time.

11. A process for preparing a synthetic whole blood substitute, consisting essentially of a non-toxic two phase liquid system, both said phases being aqueous, comprising the steps of: dispersion albumin in an aqueous solution which includes sodium chloride adding to said solution a phospholipid and an electrolyte; thoroughly mixing said solution; storing said mixture undisturbed for a period of time to form a two phase coacervate system;

one of said phases being an aqueous liquid coacervate phase (internal suspension phase) which is relatively non-polar and which is capable, when introduced into a body's circulation, of functioning as a substitute for at least part of the erythrocyte portion of whole blood;

the other of said phases being an aqueous liquid external equilibrium phase which is relatively polar and which is capable, when introduced into said circulation, of functioning as a substitute for at least part of the plasma portion of whole blood;

said relatively non-polar coacervate phase being insoluble in and in equilibrium with said relatively polar external equilibrium phase;

whereby said two phase liquid system, upon introduction into said circulation, can establish, reestablish and maintain normal osmotic pressures, and can transport and transfer oxygen, carbon dioxide and other physiological gases, and carry nutrients, drugs and various physiological entities in stable form over extended periods of time.

4,874,743

DNA SEQUENCES, RECOMBINANT DNA MOLECULES AND PROCESSES FOR PRODUCING HUMAN PHOSPHOLIPASE INHIBITOR-LIKE POLYPEPTIDES

Barbara P. Wallner, Cambridge; R. Blake Pepinsky, Watertown, and Jeffrey L. Garwin, Bedford, all of Mass., assignors to Biogen, Inc., Cambridge, Mass.

Continuation-in-part of Ser. No. 690,146, Jan. 10, 1985. This application Mar. 15, 1985, Ser. No. 712,376

Int. Cl.[4] A61K *37/02;* **C07K** *13/00*

U.S. Cl. 514—12 **9 Claims**

1. A substantially pure phospholipase inhibitor, the phospholipase inhibitor:

(a) being capable of inhibiting phospholipase A_2 enzymes; and

(b) comprising the following tryptic fragments:

(1) ser, glu, ile, asp, met, asn, glu, ile, lys;

(2) lys, val, phe, gln, asn, atyr, arg;

(3) thr, pro, ala, gln, phe, asp, ala, asp, glu, leu, leu, arg;

(4) ala, ala, tyr, leu, gln, glu, thr, gly, lys, pro, leu, asp, glu, glu, thr, leu, lys; and

(5) gly, leu, gly, thr, asp, glu;

the phospholipase inhibitor further being selected from the group consisting of:

(a) a mature phospholipase inhibitor protein, and

(b) an f-met-phospholipase inhibitor protein.

4,874,744

METHOD OF USING MELANOCYTE STIMULATING HORMONE AS DERMATIS TREATMENT

James J. Nordlund, and Lawrence A. Rheins, both of Cincinnati, Ohio, assignors to University of Cincinnati, Cincinnati, Ohio

Filed Mar. 13, 1989, Ser. No. 323,606

Int. Cl.[4] A61K *37/02;* **C07K** *7/08*

U.S. Cl. 514—13 **9 Claims**

1. A method of treating dermatitis of a mammal comprising applying an effective amount of melanocyte stimulating hormone to a dermatitis affected portion of said mammal's epiderial layer.

4,874,745

RENIN-INHIBITORY PEPSTATIN PHENYL DERIVATIVES

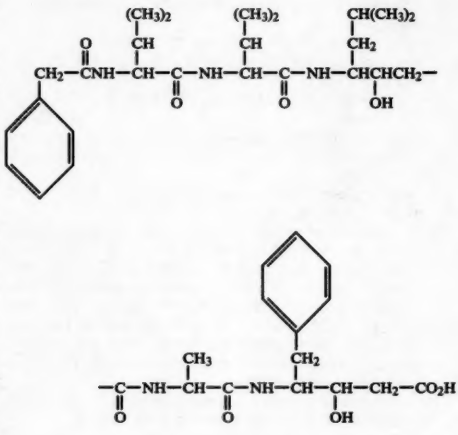
Leeyuan Huang, Watchung; Lawrence Koupal, Colonia; Joseph Dunn, Jr., Parlin; Jerrold M. Liesch, Princeton Junction; Otto Hensens, Red Bank, and H. Boyd Woodruff, Watchung, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Oct. 1, 1987, Ser. No. 103,324

Int. Cl.[4] H61K *37/43;* **C07K** *5/10*

U.S. Cl. 514—18 **6 Claims**

1. A compound of the formula



or a pharmaceutically-acceptable salt thereof.

4,874,746

WOUND HEADLING COMPOSITION OF TGF-ALPHA AND PDGF

Harry N. Antoniades, Newton, and Samuel E. Lynch, Jamaica Plain, both of Mass., assignors to Institute of Molecular Biology, Inc., Boston and President and Fellows of Harvard College, Cambridge, both of, Mass.

Filed Dec. 22, 1987, Ser. No. 136,399

Int. Cl.[4] A61K *37/36*

U.S. Cl. 514—21 **8 Claims**

5. A wound healing composition comprising purified platelet-derived growth factor and purified transforming growth factor alpha, in a weight to weight ratio of 1:4 to 25:1.

4,874,747

POLYCYCLIC HETEROCYCLIC COMPOUNDS, A PROCESS FOR THEIR PREPARATION AND THEIR USE IN HUMAN AND VETERINARY MEDICINE

Braham Shroot, Antibes; Jacques Eustache, Grasse; Jean-Michel Bernardon, Nice, and Philippe Nedoncelle, Grasse, all of France, assignors to Centre International de Recherches Dermatologiques (CIRD), Valbonne, France

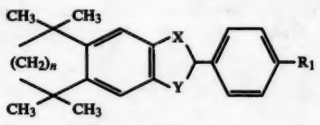
Filed Apr. 29, 1988, Ser. No. 188,547

Claims priority, application France, Apr. 30, 1987, 87 06152

Int. Cl.[4] A61K *31/42, 31/535;* **C07D** *413/10*

U.S. Cl. 514—23 **12 Claims**

1. A polycyclic heterocyclic compound having the formula



(I)

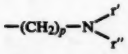
wherein

n is 1 or 2,

R_1 represents (i) hydrogen, (ii) $—CH_2OH$ or (iii)

R_2 represents (a) hydrogen, (b)

or (c) $—OR_3$ *wherein* R_3 represents hydrogen, alkyl having 1–20 carbon atoms, monohydroxyalkyl, polyhydroxyalkyl, phenyl, phenyl substituted by halogen, hydroxy, nitro or lower alkyl, benzyl, phenethyl, a sugar radical selected from the group consisting of glucose, mannose, erythrose and galactose, or



wherein p is 1, 2 or 3 and r′ and r″ represents hydrogen, lower alkyl, monohydroxyalkyl, polyhydroxyalkyl, phenyl, phenyl substituted by halogen, hydroxy, nitro or lower alkyl, aminated sugar radical selected from the group consisting of glucosamine, galactosamine and mannosamine, or r′ and r″ taken together form a heterocycle selected from the group consisting of piperidino, piperazino, morpholino, pyrrolidino and 4-(2′-hydroxyethyl) piperazino,

X represents oxygen,

Y represents a nitrogen atom, or a salt of said polycyclic heterocyclic compound of formula I.

4,874,748

CLONING VECTORS FOR STREPTOMYCES AND USE THEREOF IN MACROLIDE ANTIBIOTIC PRODUCTION

Leonard Katz; James Tuan, both of Waukegan, and James B. McAlpine, Libertyville, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Mar. 24, 1986, Ser. No. 843,116

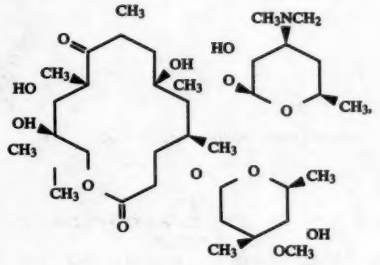
Int. Cl.[4] A61K *31/71;* **C07H** *17/08*

U.S. Cl. 514—29 **9 Claims**

9. An antibiotic composition comprising:

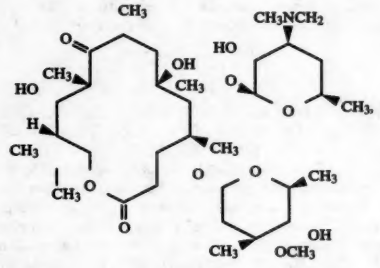
a diluent or carrier compatible with antibiotic activity; and an effective amount of an antibiotic selected from the group consisting of:

2-norerythromycin A:



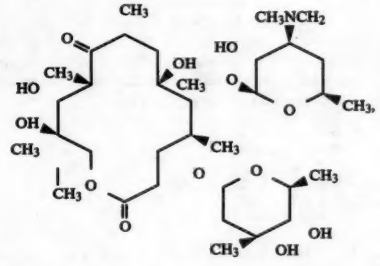
or a pharmaceutically acceptable salt thereof;

2-norerythromycin B:



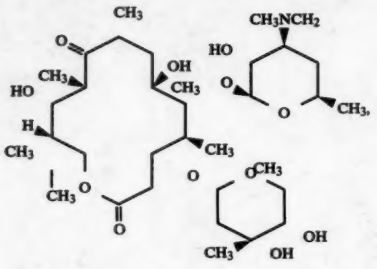
or a pharmaceutically acceptable salt thereof;

2-norerythromycin C:



or a pharmaceutically acceptable salt thereof; and

2-norerythromycin D:



or a pharmaceutically acceptable salt thereof.

4,874,749

4''-DEOXY-4-N-METHYLAMINO AVERMECTIN BLA/BLB

Helmut Mrozik, Matawan, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Jul. 31, 1987, Ser. No. 80,942

The portion of the term of this patent subsequent to Jan. 24, 2001, has been disclaimed.

Int. Cl.[4] A61K *31/70*; C07H *17/04*

U.S. Cl. 514—30 7 Claims

1. 4''-Deoxy-4''-N-methylaminoavermectin Bla/Blb and pharmaceutically acceptable acid addition salts thereof.

4. A method for the treatment of agricultural insects which comprises applying to an area infested with such agricultural insects an effective amount of the compound of claim 1.

4,874,750

PHARMACEUTICAL COMPOSITION CONTAINING A DERIVATIVE OF PARA-AMINOBENZOIC ACID AS AN ACTIVE INGREDIENT

Chikao Yoshikumi, Kunitachi; Yoshio Ohmura, Funabashi; Fumio Hirose, Tokyo; Masanori Ikuzawa, Tachikawa; Kenichi Matsunaga; Takayoshi Fujii, both of Tokyo; Minoru Ohhara, and Takao Ando, both of Tokyo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 786,851, Oct. 11, 1985, Pat. No. 4,673,669, which is a division of Ser. No. 294,574, Aug. 20, 1981, Pat. No. 4,637,998, which is a division of Ser. No. 81,190, Oct. 2, 1979, Pat. No. 4,322,408, which is a continuation-in-part of Ser. No. 24,095, Mar. 26, 1979, abandoned. This application Sep. 17, 1986, Ser. No. 908,273

Claims priority, application Japan, Apr. 11, 1978, 53-42576; May 26, 1978, 53-63146; Dec. 29, 1978, 53-161385; Dec. 29, 1978, 53-161386

The portion of the term of this patent subsequent to Apr. 19, 2000, has been disclaimed.

Int. Cl.[4] A61K *31/70*

U.S. Cl. 514—42 16 Claims

1. A method for the treatment of tumor, which comprises administering to a patient suffering from tumor an effective amount of a compound of the formula:

wherein R^1 denotes one member selected from the group consisting of the residual groups formed by removing OH at 1(alpha) or 1(beta) position from arabinose, glucose, galactose and mannose, or a pharmaceutically acceptable salt thereof.

4,874,751

ANTIBACTERIAL TREATMENT

Lowrie M. Beacham, III, Durham; Harry S. LeBlanc, Raleigh, and George A. Freeman, Cary, all of N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Continuation of Ser. No. 776,901, Sep. 17, 1985, abandoned. This application Dec. 2, 1988, Ser. No. 279,324

Claims priority, application United Kingdom, Mar. 16, 1985, 8506868; May 9, 1985, 8511775

Int. Cl.[4] A61K *31/70*

U.S. Cl. 514—50 6 Claims

1. A method of treating a susceptible gram-negative bacteria infection in an animal having a susceptible gram-negative bacteria infection comprising administering to said animal an effective gram-negative bacteria infection treatment amount of 3'-azido-3'-deoxythymidine or a pharmaceutically acceptable alkali metal, alkaline earth or ammonium salt thereof.

4,874,752

BENZOQUINONE DERIVATIVES AND PRODUCTION THEREOF

Shinji Terao, Toyonaka; Hisayoshi Okazaki, Kyoto, and Isuke Imada, Izumi, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

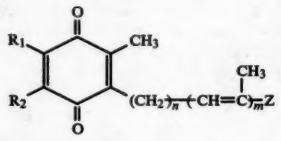
Division of Ser. No. 168,321, Mar. 18, 1988, Pat. No. 4,808,339, which is a division of Ser. No. 717,098, Mar. 28, 1985, Pat. No. 4,751,303, which is a division of Ser. No. 484,232, Apr. 12, 1983, Pat. No. 4,526,719. This application Nov. 8, 1988, Ser. No. 268,495

Claims priority, application Japan, Apr. 13, 1982, 57-62224

Int. Cl.[4] C08G *18/08*; C07C *50/06*; C07D *233/64*

U.S. Cl. 536—55.2 9 Claims

1. A compound of the formula



wherein R_1 and R_2 are the same or different and each is methyl or methoxy; n is an integer of 0 to 21; m is 0 or 1, and Z is: a group of the formula —COR_5 wherein R_5 is an α-amino acid residue or a substituted or unsubstituted glucosamine residue.

4,874,753

INSECTICIDAL COMPOSITION

Rodney C. Baker, Berkhamsted, England, assignor to AECI Limited, Johannesburg, South Africa

Filed Nov. 25, 1985, Ser. No. 801,306

Int. Cl.[4] A01N *37/34, 43/38, 53/00, 57/00*

U.S. Cl. 514—89 9 Claims

1. A dog pour-on formulation for localized external application to dogs, which includes

an insecticidally effective amount of a non-systemic compound which is tolerated by dogs and which is effective against insects selected from the group consisting of fleas and ticks; and

a C_1–C_4 alcohol as carrier for the compound, with the proviso that the formulation contains no pyrethroid, no spreading oil, and no gel- or film-forming agent.

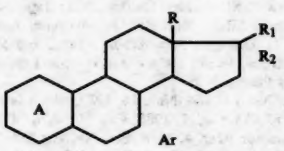
4,874,754

NOVEL 19-NOR-STEROIDS

Francois Nique, Pavillons sous Bois; Lucien Nedelec, Le Raincy; Marie-Madeleine Bouton, Paris, and Daniel Philibert, La Varenne Saint-Hilaire, all of France, assignors to Roussel Uclaf, Paris, France

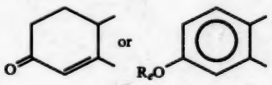
Filed Feb. 17, 1988, Ser. No. 157,417
Claims priority, application France, Feb. 18, 1987, 87 02072
Int. Cl.[4] A61K *31/58, 31/56;* C07J *1/00*
U.S. Cl. 514—178 12 Claims

1. A 19-nor-steroid compound of the formula

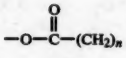


(I)

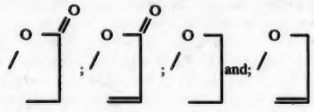
wherein the A ring is either



Re is selected from the group consisting of hydrogen, acyl and alkyl of 1 to 6 carbon atoms unsubstituted or substituted with amino or dialkylamino, R is methyl or ethyl, R_1 is selected from the group consisting of hydroxyl, protected hydroxyl, acyloxy and alkoxy of 1 to 4 carbon atoms, R_2 is selected from the group consisting of hydrogen, alkyl of 1 to 8 carbon atoms, alkenyl and alkynyl of 2 to 8 carbon atoms, acyl, aralkyl of 7 to 15 carbon atoms, the substituents other than hydrogen being unsubstituted or substituted with at least one member of the group consisting of halogen, alkyl of 1 to 4 carbon atoms for the aryl and aralkyl, methoxy, ethoxy, propyloxy, isopropyloxy and butyloxy, methylthio, ethylthio, propylthio, isopropylthio and butylthio, amino, methylamino, ethylamino, diemethyl-amino, diethylamino, methyl-ethylamino, each of the dialkyl-amino optionally being in oxidized form, aminomethyl or aminoethyl, dimethyl-aminomethyl, dimethylaminoethyl, dimethylaminoethyoxy, hydroxyl, acetoxy, a group of the formula



CO_2H in which n=2 to 5, acetyl propionyl, butyryl, benzoyl, carboxy, methoxycarbonyl or ethoxycarbonyl, cyano, trifluoromethyl, aryl and aralkyl optionally substituted or R_1 and R_2 together form a group selected from the group consisting of



Ar is a 5- or 6-membered aryl selected from the group consisting of (a) phenyl unsubstituted or substituted with at least one member of the group consisting of halogen, alkyl, alkoxy, alkylthio of 1 to 4 carbon atoms, amino, alkylamino, dialkylamino, dialkylaminoalkoxyl, hydroxyl, acyl, free, esterified or salified carboxyl, cyano, trifluoromethyl, phenyl or benzyl unsubstituted or substituted with at least one alkyl of 1 to 4 carbon atoms and (b) a heterocyclic selected from the group consisting of thienyl, furyl, thiazolyl, isothiazolyl, oxazolyl, isoxazolyl, thiadiazolyl, pyridyl and piperidinyl or their salts with non-toxic, pharmaceutically acceptable bases or acids.

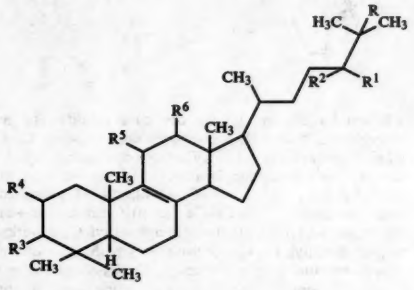
4,874,755

ANTI-INFLAMMATORY AND ANTIDEGENRATIVE COMPOUNDS ISOLATED FROM L-681,512

Bonnie M. Ashe, Scotch Plains, and Daniel S. Fletcher, Bridgewater, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Dec. 21, 1987, Ser. No. 135,898
Int. Cl.[4] A61K *31/56*
U.S. Cl. 514—179 2 Claims

1. A method of treating inflammation and degeneration in mammals which comprises administering to a mammal in need of such treatment an anti-inflammatory and antidegenerative amount a compound having the formula:



wherein:
R is OH or is absent;
R^1 and R^2 together form $=CH_2$, $—CH_2O—$;
R^3 is OH, HSO_3O, $HOCOCH_2CH_2CO_2$;
R^4 is OH, $HOC_{15}H_{30}CO_2$, AcO, or is absent
R^5 is =O, OH, AcO; and
R^6 is CH_3, OH, AcO.

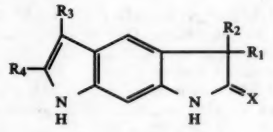
4,874,756

BENZODIPYRROLES, PROCESSES FOR THE PREPARATION THEREOF AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Alfred Mertens, Schriesheim; Wolfgang von der Saal, Weinheim; Herbert Berger, Mannheim; Bernd Müller-Beckmann, Grü stadt, and Klaus Strein, Hemsbach, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Filed Aug. 29, 1986, Ser. No. 902,182
Claims priority, application Fed. Rep. of Germany, Aug. 29, 1985, 3530825
Int. Cl.[4] A61K *31/55;* C07D *487/04*
U.S. Cl. 514—212 16 Claims

1. A compound of the formula:



(I)

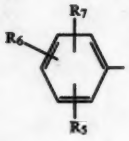
wherein
R_1 is hydrogen, C_1–C_6 alkyl, C_2–C_6 alkenyl, or C_3–C_7 cycloalkyl;
R_2 is hydrogen, C_1–C_6 alkyl, C_2–C_6 alkenyl, cyano, or a carbonyl group substituted by hydroxyl, C_1–C_6 alkyl,

C_1–C_6 alkoxy, amino, C_1–C_6 alkylamino, di-C]hd 1]l -C_6-alkyl-amino or hydrazino; or

R_2 and R_1 together with the carbon to which they are attached form a C_3–C_7 cycloalkylene ring, or R_1 and R_2 together form C_3–C_7 cycloalkylidene,

R_3 is hydrogen, cyano, C_1–C_7 alkyl, C_2–C_7 alkenyl, C_3–C_7 cycloalkyl, C_3–C_7 cycloalkenyl, C_1–C_7 alkylcarbonyl, C_1–C_7 alkoxycarbonyl, carboxyl, aminocarbonyl, C_1–C_7 alkylaminocarbonyl, di-C_1–C_7-alkylaminocarbonyl, or C_6–C_{12} aryl;

R_4 is hydrogen, C_1–C_7 alkyl, trihalomethyl, C_3–C_7 cycloalkyl, hydroxyl, cyano, carboxyl, C_1–C_7 alkoxy-carbonyl, C_1–C_7 alkyl-carbonyl, aminocarbonyl, C_1–C_7 alkyl-aminocarbonyl or di-C_1–C_7-alkylamino-carbonyl, or R_4 is a phenyl ring of the formula:



(II)

wherein R_5, R_6 and R_7 are the same or different and wherein R_5, R_6 and R_7 each represents hydrogen, C_1–C_5 alkyl-sulphonyloxy, trifluoromethanesulphonyloxy, C_1–C_5 alkyl-sulphonylamino, trifluoromethanesulphonylamino, N-C_1–C_5-alkyl-C_1–C_5-alkyl-sulphonylamino, N-C_1–C_5-alkyl-trifluoromethane-sulphonylamino, C_1–C_5-alkyl-sulphenylmethyl, C_1–C_5-alkyl-sulphinylmethyl, C_1–C_5-alkylsulphonymethyl; a carbonyl group substituted by a hydroxyl, C_1–C_5-alkoxy, amino, C_1–C_5-alkylamino or di-C_1–C_5-alkyl-amino; or a sulphonyl group substituted by an amino, C_1–C_5 alkylamino, di-C_1–C_5-alkyl-amino or by morpholino, pyrrolidino, piperidino or hexamethyleneiminosulphonyl; or a C_1–C_5 alkylcarbonylamino, amino-carbonylamino, C_1C_5 alkyl-aminocarbonylamino, C_1–C_5 alkylthio, C_1–C_5 alkylsulphinyl, C_1–C_5 alkylsulphonyl, nitro, halogen, amino, hydroxyl, C_1–C_5-alkyl, C_1–C_5-alkoxy, C_2–C_5 alkenyloxy, C_2–C_5 alkynyloxy, cyano-C_1–C_5-alkoxy, carboxy-C_1–C_5-alkoxy, C_1–C_5-alkoxy-carbonyl-C_1–C_5-alkoxy, di-C_1–C_5-alkylamino, 1-imidazolyl, trifluoromethyl or cyano group,

X is oxygen or sulphur

a tautomer thereof or

a physiologically acceptable salt thereof with an inorganic or organic acid.

13. A method of treating heart or circulatory diseases in a patient having the disease comprising administering an effective amount for treating heart or circulatory diseases, of the compound of claim 1.

4,874,757
ANTINFLAMMATORY COMPOSITIONS AND METHODS

Thomas C. Crawford; Stanley L. Keely, both of Ledyard; David L. Larson, East Lyme; Joseph G. Lombardino, Niantic, and James J. Maciejko, Mystic, all of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 179,829, Apr. 11, 1988, Pat. No. 4,812,455, which is a division of Ser. No. 941,140, Dec. 12, 1986, Pat. No. 4,766,117, which is a division of Ser. No. 821,183, Jan. 21, 1986, Pat. No. 4,672,061, which is a division of Ser. No. 695,590, Jan. 28, 1985, Pat. No. 4,579,846, which is a continuation-in-part of Ser. No. 659,602, Oct. 11, 1984, abandoned. This application Nov. 4, 1988, Ser. No. 267,157

Int. Cl.[4] A61K *31/54*

U.S. Cl. 514—226.5 **4 Claims**

1. A method for reducing gastric irritation or ulceration in a mammal being treated with an anti-inflammatory effective amount ot piroxicam or a pharmaceutical acceptable salt thereof which comprises coadministration of acetaminophen or a pharmaceutically acceptable salt thereof in an amount which reduces said gastric erritation or ulcerations.

4,874,758
NOVEL ENOLAMIDES, PHARMACEUTICAL COMPOSITIONS AND METHODS OF USE THEREOF FOR ACTIVITY AS MODULATORS OF THE ARACHIDONIC ACID CASCADE

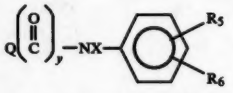
Mary E. Carethers, Cincinnati, Ohio; Wiaczeslaw A. Centenko; David T. Connor, both of Ann Arbor, Mich.; Elizabeth A. Johnson, Corte Madera, Calif.; John S. Kiely, Ann Arbor, Mich.; Charles F. Schwender, Califon, N.J.; Jagadish C. Sircar, Ann Arbor, Mich.; Roderick J. Sorenson, Ann Arbor, Mich.; Paul C. Unangst, Ann Arbor, Mich., and Robert F. Bruns, Ann Arbor, Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 121,264, Nov. 16, 1987, which is a division of Ser. No. 782,623, Oct. 1, 1985, Pat. No. 4,761,424. This application Mar. 4, 1988, Ser. No. 164,355

Int. Cl.[4] A61K *31/38*; C07D *279/02, 279/16*

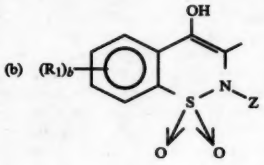
U.S. Cl. 514—226.5 **11 Claims**

1. A compound having the formula



I

and pharmaceutically acceptable salts thereof, wherein (1) y is one or two; (2) Q is a substituent selected from the group consisting of the formula



I_2

wherein b is zero, one, two, three, or four, X and Z are independently hydrogen or lower alkyl; R_1 may be the same or different if b is two or more, selected from a group Consisting of alkyl of from one to four carbons, inclusive; alkoxy of from one to four carbons, inclusive; carboalkoxy of from two to four carbons, inclusive; hydroxy, halogen, nitro, amino, mono- and di- alkylamino having each alkyl the same or different of from one to four carbons, inclusive; alkylsulfonamido of from one to four carbons, inclusive; alkylsulfinyl of from one to four carbons, inclusive; alkylsulfonyl of from one to four carbons, inclusive; and —(CH=CH—CH=CH)— taken together with an adjacent ring carbon to form a benzo radical; (3) R_5 is hydrogen; alkyl of from one to four carbons, inclusive; alkoxy of from one to four carbons, inclusive; carbalkoxy of from two to four carbons, inclusive; hydroxy; halogen; or —CH=CH—CH=CH— taken together with adjacent carbons to form a benzo radical; (4) R_6 is alkyl of from six to twenty carbons, —CH=CH—R_4, —$(CH_2)_nCOR_4$, or —$(CH_2)_n$—R_4 wherein n is zero to four, inclusive; and R_4 is phenyl optionally substituted at the two through six positions by hydrogen, carboalkoxy, having alkoxy of from one to four carbons, inclusive; alkoxy, or thioalkoxy of from one to four carbons, inclusive; phenalkoxy of from one to four carbons inclusive; amino, monoalkyl and dialkyl amino having the alkyl of from one to four carbons, inclusive; aklanoylamino of from one to four carbons, inclusive; alkanoylamino of from two to six carbons, inclusive; carboxyl, benzo, halogen, hydroxy, hydroxyalkyl of from one to four Carbons, inclusive; alkanoyl of from one to four carbons, phenyl; with the overall proviso that when Q is

I_2 having y as one, then R_6 cannot be alkyl, R_4 cannot be phenyl in $-(CH_2)_n-R_4$ and R_5 cannot be $-(CH=CH-CH=CH)$.

10. A pharmaceutical composition comprising an antiasthmatic, antiallergic, cardiovascular, antimigraine or antiinflammatory effective amount of a compound as claimed in claim 1 together with a pharmaceutically acceptable carrier.

4,874,759
5-HYDROXYINDOLE-3-CARBOXYLIC ACID AMIDE COMPOUNDS, PHARMACEUTICAL COMPOSITIONS AND USE

Tetsuya Tahara, Nakatsu; Tsuguo Ikebe, Shimoge; Ichiro Hakamada, and Osamu Yaoka, both of Nakatsu, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

PCT No. PCT/JP88/00035, § 371 Date Sep. 23, 1988, § 102(e) Date Sep. 23, 1988, PCT Pub. No. WO88/05432, PCT Pub. Date Jul. 28, 1988

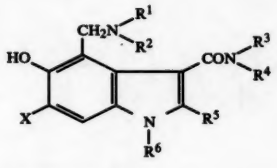
PCT Filed Jan. 19, 1988, Ser. No. 261,836

Claims priority, application Japan, Jan. 23, 1987, 62-14943

Int. Cl.[4] A61K *31/405, 31/535;* **C07D** *209/42, 413/06*

U.S. Cl. 514—232.5 **6 Claims**

1. A 5-hydroxyindole-3-carboxylic acid amide compound of the general formula:



wherein R^1, R^2, R^3 and R^4 are, the same or different, respectively a hydrogen atom, an alkyl group, an aryl group, an aralkyl group or a heteroaryl group, or R^1 and R^2 and/or R^3 and R^4 are respectively groups which are combined to each other taken together with the adjacent nitrogen atom to form a heterocyclic group, R^5 is an alkyl group, R^6 is a hydrogen atom, an alkyl group, a cycloalkyl group, an aryl group or an aralkyl group and X is a hydrogn atom, a halogen atom or a lower alkanoyl group, or its acid addition salt.

5. A pharmaceutical compositin comprising a compound as claimed in claim 1 and a pharmaceutically acceptable additive.

4,874,760
4,7-DIHYDROISOTHIAZOLO(5,4-B)PYRIDINE DERIVATIVES AND CARDIOVASCULAR TREATING AGENTS CONTAINING SAID DERIVATIVES

Shin-ichi Yamada, Fukushima; Takao Goto, Koori; Toshihisa Mashiko, Fukushima; Kentaro Kogi, Shiraishi; Yukiko Oguchi, and Senichi Narita, both of Fukushima, all of Japan, assignors to Toa Eiyo, Ltd., Tokyo, Japan

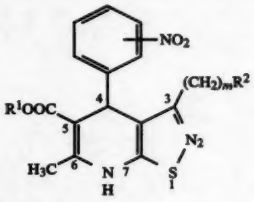
Filed Jan. 5, 1988, Ser. No. 140,999

Claims priority, application Japan, Jan. 9, 1987, 62-1782

Int. Cl.[4] A61K *31/435, 31/535;* **C07D** *513/04*

U.S. Cl. 514—234.2 **4 Claims**

1. A 4,7-dihydroisothiazolo[5,4-b]pyridine derivative represented by the general formula



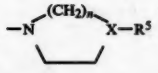
I

wherein

R^1 represents an alkyl group which may be substituted,

R^2 represents a hydroxyl group, a benzyloxy group, a lower alkoxy group, a group of the formula

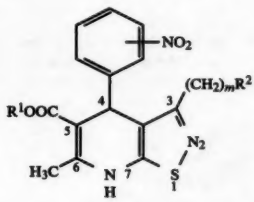
in which R^3 and R^4 are identical or different and each represents a hydrogen atom, a lower alkyl group, an aralkyl group, an aralkynyl group, an aryloxyalkyl group, an arylaminoalkyl group, a pyridylalkyl group or a benzazolylalkyl group, or R^3 and R^4 form a ring and represent a group of the formula



where X represents a methine group, a a nitrogen atom or an oxygen atom, n is an integer of 1 or 2, and when X is a methine group or a nitrogen atom, R^5 represents a hydrogen atom, a lower alkyl group, a lower hydroxyalkyl group, an aryl group, an aryloxy group, an aralkyl group, a furoyl group, a pyridyl group or a diphenylmethane group each of which may be substituted, and

m is an integer of 1 to 3; or an acid addition salt thereof.

4. An agent for treating cardiovascular diseases, said agent comprising as an active ingredient a 4,7-dihydroisothiazolo[5,4-b]pyridine derivative represented by the general formula



I

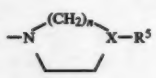
wherein

R^1 represents an alkyl group which may be substituted,

R^2 represents a hydroxyl group, a benzyloxy group, a lower alkoxy group, a group of the formula

in which R^3 and R^4 are identical or different and each

represents a hydrogen atom, a lower alkyl group, an aralkyl group, an aralkynyl group, an aryloxyalkyl group, an arylaminoalkyl group, a pyridylalkyl group or a benzoazolylalkyl group, or R^3 and R^4 form a ring and represent a group of the formula



where X represents a methine group, a nitrogen atom or an oxygen atom, n is an integer of 1 or 2, and when X is a methine group or a nitrogen atom, R^5 represents a hydrogen atom, a lower alkyl group, a lower hydroxyalkyl group, an aryl group, an aryloxy group, an aralkyl group, a furoyl group, a pyridyl group or a diphenylmethane group each of which may be substituted, and

m is an integer of 1 to 3; or an acid addition salt thereof and a pharmaceutically accepted carrier.

4,874,761

4-ARYLCARBONYL-1-[(4-MORPHOLINYL)-LOWER-ALKYL]-1H-INDOLES

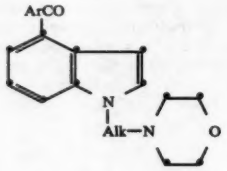
Thomas E. D'Ambra, North Greenbush, and Malcolm R. Bell, East Greenbush, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 13,313, Feb. 11, 1987, Pat. No. 4,840,950. This application Apr. 12, 1989, Ser. No. 337,220

Int. Cl.[4] A61K *31/535*

U.S. Cl. 514—235.2 **1 Claim**

1. A method for the relief of pain in a patient requiring such treatment which comprises administering orally or parenterally to such patient a medicament in solid or liquid dosage form containing, as the active component thereof, an analgesically effective amount of a compound having the formula:



where Ar is lower-alkoxyphenyl or 1-naphthyl, and Alk is lower-alkylene containing from one to four carbon atoms or a pharmaceutically acceptable acid-addition salt thereof.

4,874,762

2-AMINO-4-NICOTINOYLAMINO-6-ARYL-S-TRIAZINES AS NOOTROPIC AGENTS

Kiyoshi Kimura, Takatsuki; Fusao Ueda, Shiga, and Masaru Tamura, Kyoto, all of Japan, assignors to Nippon Shinyaku Co., Ltd., Japan

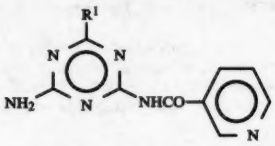
Filed May 20, 1988, Ser. No. 197,103

Claims priority, application Japan, May 20, 1987, 62-124625

Int. Cl.[4] A61K *31/53*

U.S. Cl. 514—242 **9 Claims**

1. A method of treating dementia in humans and animals which comprises administering to a human or animal in need thereof a therapeutically effective amount of a compound of the formula I:



(I)

or a pharmaceutically acceptable salt thereof wherein R^1 is hydrogen, lower alkyl, aryl or haloaryl, in combination with a pharmaceutically acceptable carrier.

4,874,763

PHARMACEUTICALLY EFFICACIOUS PTERIDINE DERIVATIVES

Ingrid Hofmann, Frankfurt am Main; Ernst Mutschler, Mainz-Hechtsheim, and Angelika Christner, Bickenbach, all of Fed. Rep. of Germany, assignors to Roehm GmbH Chemische Fabrik, Darmstadt, Fed. Rep. of Germany

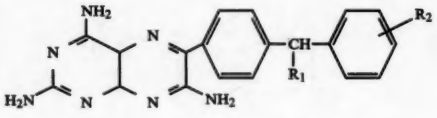
Filed Oct. 5, 1988, Ser. No. 253,699

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1987, 3740441

Int. Cl.[4] A61K *31/50*

U.S. Cl. 514—249 **7 Claims**

1. A pharmaceutically efficacious pteridine compound of formula:



wherein R_1 is hydrogen, halogen, trifluoromethyl, nitro, a $-(A)_n-OR_3$ group, wherein R_3 is hydrogen or a C_{1-6} alkyl group, a $-(A)_n-NR_4R_5$ group, wherein R_4 and R_5 independently of each other are hydrogen or a C_{1-6} alkyl group or R_4 and R_5 together with the nitrogen atom form a 5- or 6-membered ring that is substituted with a C_{1-4} alkyl group and wherein A is a linking group having 1 to 6 linking carbon atoms, one of which can be replaced by oxygen and wherein n is zero or one, and

wherein R_2 is hydrogen or, independently of R_1, has the same meaning as R_1, with the proviso that R_1 and R_2 are not simultaneously hydrogen, and the physiologically acceptable acid addition salts thereof.

4,874,764

BENZOHETEROCYCLIC COMPOUNDS

Hiraki Ueda; Hisashi Miyamoto; Shinji Aki, and Tatsuya Otsuka, all of Tokushima, Japan, assignors to Otsuka Pharmaceutical Company, Limited, Tokyo, Japan

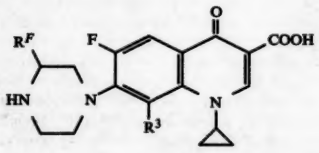
Continuation-in-part of Ser. No. 17,247, Feb. 20, 1987, abandoned. This application Jun. 18, 1987, Ser. No. 63,401

Claims priority, application Japan, Feb. 25, 1986, 61-40921; May 8, 1986, 61-105655; May 22, 1986, 61-118568; Jul. 23, 1986, 61-173370; Aug. 19, 1986, 61-193838; Sep. 30, 1986, 61-233837; Oct. 15, 1986, 61-246050; Dec. 18, 1986, 61-303515; Feb. 19, 1987, 62-37000

Int. Cl.[4] A61K *31/495*; C07D *403/04*

U.S. Cl. 514—254 **9 Claims**

1. A compound of the formula:



wherein R^3 is C_1–C_6 alkyl and R^F is C_1–C_6 alkyl, or a pharmaceutically acceptable salt thereof.

7. A method for the treatment of bacterial infectious diseases, which comprising administering an effective amount of the compound as set forth in claim 1 as an antimicrobial agent.

4,874,765
1,4-DISUBSTITUTED PIPERAZINES HAVING DOPAMINERGIC ACTIVITY

Erzsébet Lapis; Edit Tóth, both of Budapest; Béla Kiss, Vecsés; József Törley, Budapest; Éva Pálosi, Budapest; István Hajdu, Budapest; László Szporny, Budapest; Dóra Groó, Budapest, and István Laszlovszky, Budapest, all of Hungary, assignors to Richter Gedeon Vegyeszeti Gyar, Budapest, Hungary

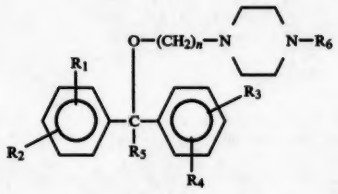
Filed Apr. 22, 1987, Ser. No. 41,206

Claims priority, application Hungary, Apr. 22, 1986, 2251/1749/86

Int. Cl.[4] A61K *31/495;* **C07D** *295/08, 295/10*

U.S. Cl. 514—255 **4 Claims**

1. A 1,4-disubstituted piperazine having dopaminergic activity of the formula (I),



wherein

R_1, R_2, R_3 are the same or different and stand for hydrogen or halogen or a trihalomethyl, lower alkyl, lower alkoxy, nitro, hydroxyl or phenylalkyloxy group,

R_4 stands for hydrogen or halogen or a trihalomethyl, lower alkyl, lower alkoxy, nitro, hydroxyl, phenylalkyloxy or an 1-(2-propenyl-4-piperazinyl) group;

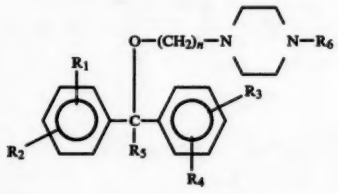
R_5 stands for hydrogen or a C_{1-4} alkyl group;

R_6 represents a C_{3-6} alkenyl or alkynyl group; and

n is 2 or 3,

and pharmaceutically acceptable acid addition salts thereof.

4. A method of treating diseases arising from a decrease in the dopamine level which comprises administering to a mammal (including man) in need of such treatment a therapeutically effective amount of the compound of the formula (I),



wherein

R_1, R_2, R_3 are the same or different and stand for hydrogen or halogen or a trihalomethyl, lower alkyl, lower alkoxy, nitro, hydroxyl or phenylalkyloxy group;

R_4 stands for hydrogen or halogen or a trihalomethyl, lower alkyl, lower alkoxy, nitro, hydroxyl, phenylalkyloxy or an 1-(2-propenyl-4-piperazinyl) group;

R_5 stands for hydrogen or a C_{1-14} alkyl group;

R_6 represents a C_{3-6} alkenyl or alkynyl group; and

n is 2 or 3,

or a pharmaceutically acceptable acid addition salt.

4,874,766
METHOD OF PROMOTING WOUND-HEALING

Leo A. A. Ooms, Wechelderzande, and Anne-Dominique A. Y. Degryse, Herentals, both of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

Continuation-in-part of Ser. No. 909,991, Sep. 22, 1986, abandoned. This application Aug. 24, 1987, Ser. No. 88,444

Int. Cl.[4] A61K *31/505*

U.S. Cl. 514—258 **17 Claims**

1. A method of promoting wound-healing, which method comprises topically applying to the wound of an amount of a serotonin-antagonistic compound effective to promote wound-healing.

4,874,767
DISCORHABDIN D, COMPOSITIONS CONTAINING SAME AND METHODS OF PREPARATIO AND USE THEREOF

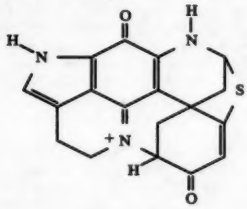
Murray H. G. Munro; Nigel B. Perry, and John W. Blunt, all of Christchurch, New Zealand, assignors to Harbor Branch Oceanographic Institution, Inc., Ft. Pierce, Fla.

Filed Jan. 9, 1989, Ser. No. 294,394

Int. Cl.[4] A61K *31/395, 31/38;* **C07D** *513/22, 495/99*

U.S. Cl. 514—278 **4 Claims**

1. The compound of the formula:



4,874,768
1,2-DISUBSTITUTED ERGOLINES USEFUL FOR PRODUCING CENTRAL ANTIDOPANMINERGIC OR α2-RECEPTOR-BLOCKING ACTIVITY

Andreas Huth; Gerhard Sauer, and Helmut Wachtel, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin, Fed. Rep. of Germany

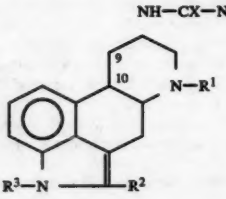
Filed Oct. 6, 1986, Ser. No. 915,358

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1985, 3535929

Int. Cl.[4] A61K *31/48;* **C07D** *45/12*

U.S. Cl. 514—288 **14 Claims**

1. A 1, 2-substituted ergoline compound of general formula I



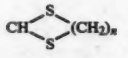
wherein

X is an oxygen or sulfur atom,

R^1 is a lower alkyl group,

R^2 is (a) halogen; (b) a C_{2-4}-carboxylic acid; (c) a lower alkyl, lower alkenyl or alkynyl group; (d) an alkyl, alkynyl or alkenyl group which is substituted by (i) OR_4 wherein R^4 is hydrogen, lower alkyl, tetrahydropyranyl or C_{5-6}-cycloalkyl, (ii) phenyl, pyridinyl, thiophenyl, furanyl, pyrimidinyl, imidazolyl or pyrazolyl, (iii) phenyl, pyridinyl, thiophenyl, furanyl, pyrimidinyl, imidazolyl or pyrazolyl substituted by a lower alkyl, lower alkoxy or halogen group; (e) an $S\text{-}R^5$ group wherein R^5 means (i) a lower alkyl group, (ii) a lower alkyl group substituted by phenyl, pyridinyl, thiophenyl, furanyl, pyrimidinyl, imidazolyl, or pyrazolyl in turn substituted by a lower alkyl, lower alkoxy or halogen group;

(f) a



group wherein n=2 or 3; or

(g) a —CHO group,

R_3 is lower alkyl or the acyl group of a C_{2-4}-carboxylic acid, and

C_9 C_{10} is a CC-single or a CC-double bond, and the hydrogen atom in the 10-position is in the α -location if C_9 C_{10} is a CC-single bond, as well as a physiologically compatible acid addition salt thereof.

12. A method of producing an antidepressant effect, comprising administering an effective amount of a compound of claim 1.

13. A method of producing a neuroleptic effect, comprising administering an effective amount of a compound of claim 1.

14. A method of treating schizophrenia, comprising administering an effective amount of a compound of claim 1.

4,874,769

QUINOLINYL ETHER OR THIOETHER TETRAZOLES AS AGENTS FOR THE TREATMENT OF HYPERSENSITIVE AILMENTS

Raymond Youssefyeh, Princeton Junction; Utpal Chakraborty, Flemington, both of N.J.; Ernest Magnien, Norwich, Vt.; Rohit Desai, Millwood, and Thomas D-Y Lee, Scarsdale, both of N.Y., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.

PCT No. PCT/US87/00560, § 371 Date Jan. 5, 1988, § 102(e) Date Jan. 5, 1988, PCT Pub. No. WO87/05510, PCT Pub. Date Sep. 24, 1987

Continuation-in-part of Ser. No. 839,410, Mar. 13, 1986, Pat. No. 4,839,369, and a continuation of Ser. No. 723,781, Apr. 16, 1985, Pat. No. 4,631,287, which is a continuation-in-part of Ser. No. 911,028, Sep. 24, 1986. This PCT application Mar. 11, 1987, Ser. No. 124,800

The portion of the term of this patent subsequent to Dec. 23, 2003, has been disclaimed.

Int. Cl.[4] A61K *31/47*; C07D *265/30, 295/00*

U.S. Cl. 514—314 **6 Claims**

1. A compound selected from the group consisting of 5-[3-(2-ethyl-5-(2-quinolylmethyloxy)phenoxy)propyl]tetrazole, 5-[3-(2-methyl-4-(2-quinolylmethyloxy)phenoxy)propyl]tetrazole, 5-[3-(5-methyl-3-(2-quinolylmethyloxy)phenoxy)propyl]tetrazole, 5-[3-(4-(2-(5-bromo-6-methoxy)quinolylmethyloxy)-phenoxy)propyl]tetrazole, 5-[3-(4-(2-(6-methoxy)quinolylmethyloxy)phenoxy)propyl]tetrazole, 5-[3-(4-(2-quinolylmethylthio)phenoxy)propyl]tetrazole, 5-[3-(4-(2-quinolylmethyloxy)-thiophenoxy)propyl]tetrazole, 5-[2-(4-(2-quinolylmethyloxy)-phenyl)ethyl]tetrazole, 5-[4-(4-(2-quinolylmethyloxy)phenyl)-butyl]tetrazole and 5-[(3-(2-quinolylmethyloxy)phenoxy)methyl]tetrazole.

4,874,770

ARYL-SUBSTITUTED (N-PIPERIDINYL)METHYL- AND (N-PIPERIDINYL) METHYLAZOLES HAVING ANTIPSYCHOTIC PROPERTIES

Ineke Van Wijngaarden; Cornelis Kruse; Johannes A. M. Van Der Heyden, and Martinus T. M. Tulp, all of Weesp, Netherlands, assignors to Duphar International Research B.V., Weesp, Netherlands

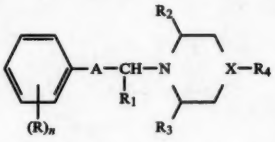
Division of Ser. No. 18,164, Feb. 24, 1987, Pat. No. 4,772,604. This application Jul. 1, 1988, Ser. No. 214,310

Claims priority, application Netherlands, Feb. 27, 1986, 8600488

Int. Cl.[4] A61K *31/445*; C07D *211/10, 211/14*

U.S. Cl. 514—326 **4 Claims**

1. Compounds of formula 1



(1)

in which the symbols have the following meanings:

R is methyl, methoxy or halogen;

n is 0–2;

R_1, R_2 and R_3 are hydrogen;

X is a carbon atom which is substituted with a group R_5, in which R_5 is hydrogen or hydroxyl;

R_4 is phenyl or benzoyl, which may be substituted with halogen or methoxy;

A is pyrrole or pyrazole, which may be substituted with methyl or phenyl; and the acid addition salts and prodrugs thereof.

4. A method of treating affections in the central nervous system, characterized in that an effective amount of a compound as claimed in claim 1 is used.

4,874,771

ETHANESULFONAMIDE DERIVATIVES

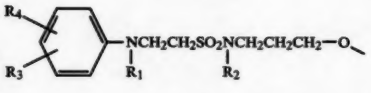
Ronald K. Russell, Titusville, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Sep. 6, 1988, Ser. No. 240,976

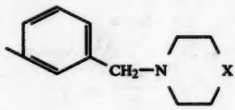
Int. Cl.[4] A61K *31/445, 31/495*; C07D *211/18, 295/08*

U.S. Cl. 514—331 **7 Claims**

1. A compound of the formula



-continued



where

R_1 is hydrogen or C_1–C_3 alkyl;

R_2 is hydrogen or a pharmaceutically acceptable alkali or alkaline earth metal ion;

R_3 is hydrogen, Cl, Br, F, C_1–C_6 alkyl, C_3–C_6 branched-chain alkyl, C_1–C_6 alkoxy, C_1–C_6 branched-chain alkoxy, CF_3, nitro, —$NHCOC_1$–C_3 alkyl, NR_5R_6 or CO_2R_7 when R_4 is hydrogen, or R_3 and R_4 are the same or different and are Cl, Br, F or CF_3;

R_5 and R_6 are the same or different and are hydrogen or C_1–C_3 alkyl;

R_7 is hydrogen or C_1–C_6 alkyl;

X is O, NR_8, CHR_8 or —$(CH_2)_n$—;

R_8 is C_1–C_3 alkyl; and

n is 0, 1, 2 or 3;

and its physiologically acceptable salts.

4,874,772

ANTIASTHMATIC AGENT

Setsuo Kobayashi, Gunma; Tsugio Nakazawa, Gunma; Yasumasa Yoshie, Gunma; Yasushi Abiko, Tokyo, and Kinya Kameda, Tokyo, all of Japan, assignors to Daiichi Seiyaku Co., Ltd., Tokyo, Japan

Filed Apr. 27, 1988, Ser. No. 186,859

Claims priority, application Japan, Apr. 27, 1987, 62-103727

Int. Cl.[4] A61K *31/44*

U.S. Cl. 514—341 **2 Claims**

1. A process for treating asthma which comprises administering 2-[2phenyl-2(2pyridyl)]-ethyl-2-imidazoline in an amount effective for treating asthma to a patient in need of such treatment.

4,874,773

3-AMINOCARBONYL-1,4-DIHYDROPYRIDINE-5-CARBOXYLIC ACID COMPOUNDS, AND PHARMACEUTICAL COMPOSITION CONTAINING THE SAME

Masakatu Hisaki, Hikone; Kenichi Kashima, Fujiidera; Yasuhiko Sakamoto, Habikino; Masakazu Hojo, Kyoto; Osamu Katayama, Kusatsu, and Hiroyoshi Hata, Yokohama, all of Japan, assignors to Nippon Shoji Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 920,124, Oct. 17, 1986, abandoned.

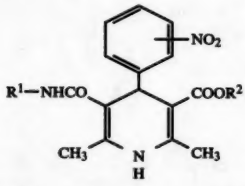
This application Aug. 30, 1988, Ser. No. 239,005

Claims priority, application Japan, Oct. 21, 1985, 60-235909

Int. Cl.[4] C07D *211/86*; A61K *31/455*

U.S. Cl. 514—355 **12 Claims**

1. A compound of the formula:



wherein R^1 is isopropyl, an allyl, propargyl, or a cycloalkyl having 3 to 8 carbon atoms, and R^2 is an alkyl selected from the group consisting of n-heptyl, n-octyl, n-nonyl and n-decyl.

4,874,774

NIFEDIPINE COMPOSITIONS AND THE PRODUCTION THEREOF

Koichi Ushimaru, Kamikyo; Tomoaki Hamakawa, Fushimi, and Tomio Koga, Shiga, all of Japan, assignors to Nippon Shinyaku Co., Ltd., Japan

Continuation of Ser. No. 670,547, Nov. 13, 1984, abandoned.

This application Aug. 12, 1986, Ser. No. 895,806

Claims priority, application Japan, Nov. 17, 1983, 58-217396

Int. Cl.[4] A61K *31/44*

U.S. Cl. 514—356 **12 Claims**

1. A pharmaceutical composition in rectal administration form which comprises a coronary vasodilating effective amount or a hypotensively effective amount of 1,4-dihydro-2,6-dimethyl-4-(2'-nitrophenyl)3,5-dicarbomethoxy-pyridine in combination with a pharmaceutically accepable carrier suitable for formulating rectally administrable compositions which comprises a mixture of 5 to 50 parts by weight of a polyethylene glycol and 50 to 95 parts by weight of a fatty acid glyceride of 12 to 18 carbon atoms.

4,874,775

AGRICULTURALLY USEFUL SULFONAMIDES

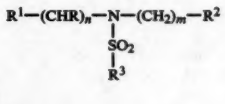
Eriks V. Krumkalns, Indianapolis, and David L. Smiley, Greenfield, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Jun. 11, 1985, Ser. No. 743,234

Int. Cl.[4] A61K *31/44*; C07D *213/42*

U.S. Cl. 514—357 **35 Claims**

1. A compound of the formula



wherein

n is 1;

m is 0, 1 or 2;

R is hydrogen; C_1–C_4 alkyl; phenyl; or phenyl monosubstituted with fluoro, chloro, bromo or iodo;

R^1 is pyridinyl; pyridinyl oxide; or 5-pyrimidinyl;

R^2 is C_3–C_8 cycloalkyl; C_4–C_{10} alkyl; cyano; phenyl mono- or disubstituted with fluoro, chloro, bromo, iodo, C_1–C_3 alkyl, C_1–C_3 (fluoro, chloro or bromo)alkyl, C_1–C_3 alkoxy, C_1–C_3 (fluoro, chloro or bromo)alkoxy, C_1–C_3 alkylthio, hydroxy, nitro, or cyano; or phenyl monosubstituted with C_3–C_8 cycloalkylmethoxy or phenoxy;

R^3 is C_1–C_6 alkyl; C_1–C_3 alkylamino; di(C_1–C_3 alkyl)amino; C_1–C_3 (fluoro, chloro or bromo)alkyl; phenyl; or phenyl mono- or disubstituted with fluoro, chloro, bromo, iodo, C_1–C_3 alkyl, or C_1–C_3 (fluoro, chloro or bromo)alkyl;

provided that R_2 is cyano only when m is 1 or 2; or an acid addition salt of compounds wherein R^1 is pyridinyl or 5-pyrimidinyl; provided that salts of compounds wherein R^1 is 5-pyrimidinyl are only hydrohalides.

16. A method of reducing the adverse effects of phytopathogens on plants which comprises applying a phytopathogen-inhibiting amount of a compound of claim 1 to the plant or to the soil in which the plant grows.

4,874,776

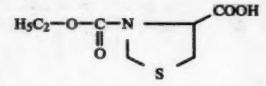
COMPOUND HAVING MUCUS REGULATING AND ELASTASE-INHIBITORY ACTIVITIES, FOR THE THERAPY OF PULMONAL EMPHYSEMA AND PULMONAL FIBROSIS

Giuseppe Quadro, Milan, Italy, assignor to Yason S.r.l., Milan, Italy

Filed Jul. 11, 1988, Ser. No. 217,384
Int. Cl.[4] C07D *277/06;* A06K *31/425*
U.S. Cl. 514—365 **4 Claims**

1. N-carbethoxy-4-thiazolidine-carboxylic acid lysine salt.

2. The method of treatment of chronic and acute affections of the respiratory system and hepatic intoxication which consists of administering to a subject in need of such treatment a compound which is a N-carbethoxy-4-thiazolidine-carboxylic acid of formula I



in the amount of 200–2 g daily or a pharmaceutically acceptable salt thereof which is an alkali, an alkaline earth, a basic amino acid salt in an equivalent amount.

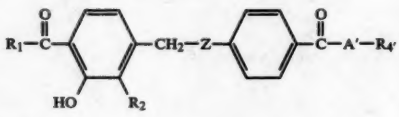
4,874,777

LEUKOTRIENE ANTAGONISTS

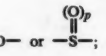
F. Patrick Carr, Indianapolis; Robert D. Dillard, Zionsville, and Doris E. McCullough, Carmel, all of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Apr. 10, 1987, Ser. No. 37,284
Int. Cl.[4] C07D *257/04;* A61K *31/41, 31/05;* C07C *39/02*
U.S. Cl. 514—381 **20 Claims**

1. A compound of the formula



and pharmaceutically acceptable salts thereof, wherein: R_1 is C_1–C_6 alkyl; R_2 is C_1–C_6 alkyl; Z is



A′ is straight or branched chain C_1–C_6 alkylidene; p is 0, 1, or 2; and R_4′ is —COOH or 5-tetrazolyl.

10. A method of treating a mammal suffering from or susceptible to any condition characterized by an excessive release of leukotrienes, which comprises administering to said mammal a leuktriene antagonizing amount of a compound of claim 1.

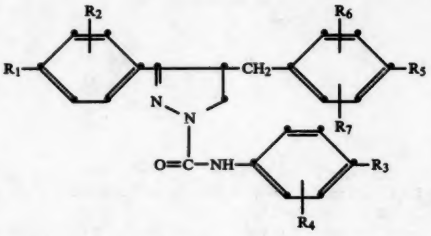
4,874,778

1-CARBAMOYL-2-PYRAZOLINES, COMPOSITION CONTAINING THEM, AND INSECTICIDAL AND ACARICIDAL METHOD OF USING THEM

Saleem Farooq, Arisdorf, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

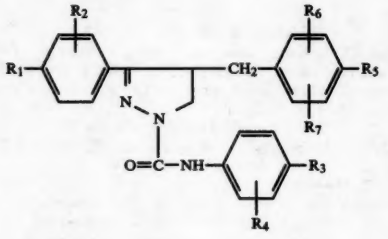
Continuation of Ser. No. 796,379, Nov. 8, 1985, abandoned. This application Jun. 22, 1987, Ser. No. 65,667
Claims priority, application Switzerland, Nov. 16, 1984, 5489/84; Oct. 22, 1985, 4551/85
Int. Cl.[4] A01N *43/56;* C07D *231/06*
U.S. Cl. 514—403 **8 Claims**

1. A compound of the formula



wherein:
R_1 is chlorine or fluorine;
R_3 is OCF_3;
R_5 is fluorine or chlorine; and
R_2, R_4, R_6 and R_7 are hydrogen.

6. A method of controlling insects and representative of the order Acarina, which method comprises contacting or treating said insects and representatives of the order Acarina or the locus thereof with an amount effective to control insects or members of the order Acarina of a compound of the formula



wherein
R_1 is chlorine or fluorine;
R_3 is OCF_3;
R_5 is fluorine or chlorine; and
R_2, R_4, R_6 and R_7 are hydrogen.

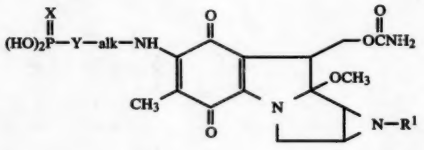
4,874,779

MITOMYCIN PHOSPHATE DERIVATIVES

Peter D. Senter, Seattle, Wash., assignor to Bristol-Myers Company, New York, N.Y.

Filed Jun. 29, 1988, Ser. No. 213,201
Int. Cl.[4] C07D *487/14;* A61K *31/40*
U.S. Cl. 514—410 **9 Claims**

1. A compound having the formula



wherein
X and Y are independently oxygen or sulfur;
alk represents a linear or branched carbon chain having 2 to 8 carbon atoms; and
R^1 is H or methyl;
or a pharmaceutically acceptable salt thereof.

4,874,780
ANTICANCER COMPOUNDS

Bernt Borretzen; Rolf O. Larsen, both of Porsgrunn; Erik O. Pettersen; John M. Dornish, both of Oslo, and Rolf Oftebro, Hvalstad, all of Norway, assignors to Norsk Hydro a.s., Oslo, Norway

Filed Mar. 11, 1987, Ser. No. 24,783
Int. Cl.[4] A61K *31/335*
U.S. Cl. 514—452 **4 Claims**

1. A compound of the formula:

wherein Ar is unsubstituted phenyl or phenyl which is substituted by alkyl of 1–5 carbon atoms, cycloalkyl of 3–6 carbon atoms, halogen, nitro, amino, monoalkylamino of 1–5 carbon atoms or dialkylamino of 1–5 carbon atoms in each alkyl group, said Ar being non-deuterated or partly or completely deuterated and X_1 and X_2 together with the carbon atom to which they are attached form a cyclic acetal; or a pharmaceutically acceptable salt thereof.

4,874,781
PESTICIDES

Michael Elliott, Stevenage; Norman F. Janes, Luton, and Bhupinder P. S. Khambay, Harrow Weald, all of England, assignors to National Research Development Corporation, London, United Kingdom

Continuation of Ser. No. 903,452, Sep. 4, 1986, abandoned. This application Jan. 11, 1988, Ser. No. 143,319
Claims priority, application United Kingdom, Sep. 4, 1985, 8521943
Int. Cl.[4] A01N *37/10, 37/34*; C07D *317/52*; C07C *69/612*
U.S. Cl. 514—463 **6 Claims**

1. A compound of formula I

I

in which formula:

Ar represents a phenyl or naphthyl group unsubstituted or substituted by one or more halogen, alkoxy, haloalkoxy, methylenedioxy, C_1–C_6 alkyl or haloalkyl groups;

R_1 represents the group $—C(CF_3)=CH_2$; and

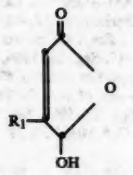
R_2 CHD represents the residue of a benzyl, fluorobenzyl or α-cyanobenzyl alcohol substituted by a phenoxy, benzyl or benzoyl group.

4,874,782
FURANONE DERIVATIVES

Rosanne Bonjouklian, Indianapolis, Ind.; Christopher J. M. Meade, Lightwater, England; Edward D. Mihelich, and Michael L. Phillips, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation of Ser. No. 750,801, Jul. 1, 1985, abandoned. This application Jun. 26, 1987, Ser. No. 66,907
Int. Cl.[4] C07D *307/60*; A61K *31/365*
U.S. Cl. 514—473 **13 Claims**

1. A compound of the formula



I

wherein R_1 is a C_{16}–C_{20} straight or branched chain hydrocarbyl group optionally containing a total of 1–6 double and/or triple bonds and optionally containing an aldehyde or hydroxymethyl group, or R-alk- where alk is a C_2–C_{12} straight or branched chain alkylidene group optionally containing 1 or 2 double or triple bonds and R is napthalenyloxy or benzylphenoxy.

4,874,783
ENHANCING COLOR STABILITY TO STERILIZING RADIATION OF POLYMER COMPOSITIONS

Linda H. Nelson, Evansville, Ind.; Roger W. Avakian, Brasschaat, Belgium, and Arnold Factor, Scotia, N.Y., assignors to General Electric Company, Pittsfield, Mass.

Division of Ser. No. 769,277, Aug. 26, 1985, which is a continuation-in-part of Ser. No. 579,103, Feb. 10, 1984, abandoned. This application Dec. 22, 1987, Ser. No. 136,606
Int. Cl.[4] C08K *5/01*
U.S. Cl. 524—482 **13 Claims**

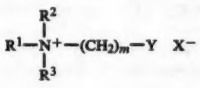
1. An irradiation sterilized medical article which is made from a composition comprising an aromatic carbonate polymer in admixture with an effective amount of a stabilizing hydroaromatic compound effective to inhibit yellowing upon exposure to sterilizing radiation, said hydroaromatic compound comprising the partially hydrogenated carbon skeleton of an aromatic system or the partially hydrogenated carbon skeleton of an aromatic system in combination with an unsaturated ring.

4,874,784
QUATERNARY AMMONIUM COMPOUNDS

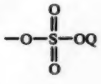
Kim R. Smith; James E. Borland, and Joe D. Sauer, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 910,417, Sep. 22, 1986, Pat. No. 4,824,867, and a continuation-in-part of Ser. No. 894,938, Aug. 8, 1986, and a continuation-in-part of Ser. No. 782,353, Oct. 1, 1985. This application Feb. 17, 1989, Ser. No. 312,125
Int. Cl.[4] A01N *41/02*
U.S. Cl. 514—517 **9 Claims**

1. A method of inhibiting the growth of bacteria, said method comprising contacting said bacteria with a bactericidal amount of a quaternary ammonium compound having the formula:



wherein R^1 is an alkyl containing 8–10 carbon atoms, R^2 is an alkyl containing 8–20 carbon atoms, methyl or ethyl, R^3 is methyl or ethyl, m is an integer from 1 to 6, X is an anion and Y is



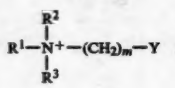
4,874,785

QUATERNARY AMMONIUM COMPOUNDS

Kim R. Smith; James E. Borland, and Joe D. Sauer, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 910,417, Sep. 22, 1986, Pat. No. 4,824,867, which is a continuation-in-part of Ser. No. 894,938, Aug. 8, 1986, which is a continuation-in-part of Ser. No. 782,353, Oct. 1, 1985.
This application Feb. 17, 1989, Ser. No. 312,260
Int. Cl.[4] A01N *37/34*
U.S. Cl. 514—526 9 Claims

1. A method of inhibiting the growth of bacteria, said method comprising contacting said bacteria with a bactericidal amount of a quaternary ammonium compound having the formula:



wherein R^1 is an alkyl containing 8–20 carbon atoms, R^2 is an alkyl containing 8–20 carbon atoms, methyl or ethyl, R^3 is methyl or ethyl, m is an integer from 1 to 6, X is an anion and Y is —CN.

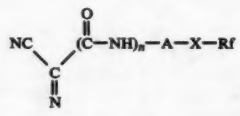
4,874,786

CYANOACETAMIDO-DERIVATIVES HAVING A FUNGICIDAL ACTIVITY

Augusto Menconi, Carrara Marina; Giovanni Camaggi, Lodi; Franco Gozzo, San Donato Milanese; Luigi Mirenna, Milan, and Carlo Garavaglia, Cuggiono, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Apr. 9, 1987, Ser. No. 36,465
Claims priority, application Italy, Apr. 15, 1986, 20081 A/86
Int. Cl.[4] A61K *31/10, 31/16, 31/165;* C07C *103/00*
U.S. Cl. 514—528 7 Claims

1. Compounds having the formula:



(Ia)

OR

wherein:

R is H, a C_1–C_4 alkyl, an alkenyl, an alkynyl radical;

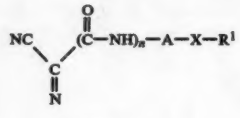
n is 1 or 2;

A represents a C_1–C_6 alkylenic, or an arylenic bridge;

X represents O, S, SO, SO_2;

R_f represents polyfluoroalkyl radicals containing from 1 to 4 carbon atoms and at least 2 fluorine atoms, and polyfluoroalkenyl radicals containing from 2 to 4 carbon atoms and at least 2 fluorine atoms.

4. A method of fighting fungus infections in useful plants, consisting essentially in distributing on the plants, or their organs or seeds, when the infection is expected or is already in progress, an effective amount of a compound having the formula:



(I)

OR

wherein:

R is H, a C_1–C_4 alkyl, an alkenyl, an alkynyl radical;

n is 1 or 2;

A represents a C_1–C_6 alklenic, or an arylenic bridge;

X represents O, S, SO, and SO_2; and

R^1 represents C_1–C_6 alkyl radicals, a phenyl radical, polyfluoroalkyl radicals containing from 1 to 4 carbon atoms and at least 2 fluorine atoms, polyfluoroalkenyl radicals containing from 2 to 4 carobn atoms and at least 2 fluorine atoms, but excluding compounds having the formula (I) wherein A is an alkylene, n is 2, and R^1 is a C_1–C_6 alkyl radical.

4,874,787

INSECTICIDAL ARTICLE FOR ELECTRIC FUMIGATOR

Shinobu Yamamoto; Kunihiro Okada; Satoshi Ohi, all of Hiroshima; Shiro Oyama, Urawa, and Yasuharu Takei, Hiroshima, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Aug. 10, 1987, Ser. No. 83,249
Claims priority, application Japan, Aug. 15, 1986, 61-191527
Int. Cl.[4] A61K *31/05;* A01N *65/00*
U.S. Cl. 514—531.125 6 Claims

1. An insecticidal article for electric fumigator consisting essentially of:

(a) a preparation comprising 2-methyl-4-oxo-3-(2-propynyl) cyclopent-2-enyl-chrysanthemate and a synergist selected from the group consisting of α-[2-(2-butoxyethoxy)ethoxy]-4,5-methylenedioxy-2-propyltoluene, octachlorodipropyl ether and N-(2-ethylhexyl)-bicyclo-[2,2,1]-hept-5-en-2,3-dicarboxyimide, wherein the weight ratio of said synergist to said chrysanthemate ranges from ¼ to 8, and

(b) a porous mat suitable for use on an insecticidal mat, said porous mat being impregnated with said preparation.

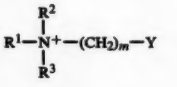
4,874,788

QUATERNARY AMMONIUM COMPOUNDS

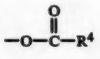
Kim R. Smith; James E. Borland, and Joe D. Sauer, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 910,417, Sep. 22, 1986, Pat. No. 4,824,867, which is a continuation-in-part of Ser. No. 894,938, Aug. 8, 1986, which is a continuation-in-part of Ser. No. 782,353, Oct. 1, 1985.
This application Feb. 17, 1989, Ser. No. 312,124
Int. Cl.[4] A01N *37/02, 37/12, 37/44*
U.S. Cl. 514—534 9 Claims

1. A method of inhibiting the growth of bacteria, said method comprising contacting said bacteria with a bactericidal amount of a quaternary ammonium compound having the formula:



wherein R^1 is an alkyl containing 8–20 carbon atoms, R^2 is an alkyl containing 8–20 carbon atoms, methyl or ethyl, R^3 is methyl or ethyl, m is an integer from 1 to 6, X is an anion and Y is



wherein R^4 is an alkyl containing 1–12 carbon atoms or phenyl.

4,874,789

QUATERNARY AMMONIUM COMPOUNDS

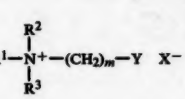
Kim R. Smith; James E. Borland, and Joe D. Sauer, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 910,417, Sep. 22, 1986, Pat. No. 4,824,867, which is a continuation-in-part of Ser. No. 782,353, Oct. 1, 1985. This application Feb. 17, 1989, Ser. No. 312,131

Int. Cl.[4] A01N *37/12, 37/44*

U.S. Cl. 514—551 7 Claims

1. A method of inhibiting the growth of bacteria, said method comprising contacting said bacteria with a bactericidal amount of a quaternary ammonium compound having the formula:



wherein R^1 is an alkyl containing 8–20 carbon atoms, R^2 is an alkyl containing 8–20 carbon atoms, methyl or ethyl, R^3 is methyl or ethyl, m is an integer from 1 to 6, X is an anion and Y is

wherein R^4 is an alkyl containing 1–12 carbon atoms.

4,874,790

METHOD FOR IMPROVING THE GLUCOSE METABOLISM OF AN ANIMAL HAVING DIABETIC TENDENCIES

Ronald T. Stanko, Pittsburgh, Pa., assignor to Montefiore Hospital Association of Western Pennsylvania, Pittsburgh, Pa.

Filed Aug. 15, 1988, Ser. No. 232,119

Int. Cl.[4] A61K *31/19*

U.S. Cl. 514—557 9 Claims

1. A method for treating an animal having diabetic tendencies to improve its Glucose Tolerance, as measured by a Glucose Tolerance Test, which comprises administering orally to the animal a therapeutically effective amount of pyruvate and dihydroxyacetone prior to administering a Glucose Tolerance Test whereby the animal exhibits lower values in the said Glucose Tolerance Test than exhibited in the absence of said amount.

4,874,791

STIMULATION OF HAIR GROWTH WITH ALIPHATIC CARBOXYLIC ACIDS

Kuniaki Adachi, Odawara; Hideo Tamai, Kanagawa, and Masanao Sadai, Hiratsuka, all of Japan, assignors to Lion Corporation, Tokyo, Japan

Continuation of Ser. No. 724,354, Apr. 18, 1985, abandoned, which is a continuation of Ser. No. 518,447, Jul. 29, 1983, abandoned. This application Oct. 28, 1986, Ser. No. 923,902

Claims priority, application Japan, Aug. 10, 1982, 57-137909

Int. Cl.[4] A61K *31/20*

U.S. Cl. 514—558 10 Claims

1. A method of stimulating growth of human hair on a human head suffering from or susceptible to alopecia which comprises bringing active human hair follicles on a human head from a telogen state into a normal anagen state by applying to said follicles a growth stimulating amount of an effective ingredient which is an aliphatic carboxylic acid which possesses an odd number of carbon atoms or derivative thereof and is selected from the group consisting of n-hendecanoic acid, n-tridecanoic acid, n-pentadecanoic acid, n-heptadecanoic acid, a glyceride of said acids, a metal salt of said acids and mixtures thereof.

4,874,792

THIOPHENYL ALKANOIC ACIDS USEFUL AS LEUKOTRIENE ANTAGONISTS

John G. Gleason, Delran; Ralph F. Hall, Robbinsville, both of N.J.; Thomas W. Ku, Dresher, and Carl D. Perchonock, Philadelphia, both of Pa., assignors to Smithkline Beckman Corporation, Philadelphia, Pa.

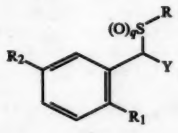
Continuation of Ser. No. 926,314, Oct. 31, 1986, abandoned, and a continuation-in-part of Ser. No. 848,608, Apr. 7, 1986, abandoned, which is a continuation-in-part of Ser. No. 725,264, Apr. 19, 1985, abandoned. This application Mar. 25, 1988, Ser. No. 173,210

The portion of the term of this patent subsequent to Apr. 11, 2006, has been disclaimed.

Int. Cl.[4] C07C *149/40;* A61K *31/10*

U.S. Cl. 514—570 48 Claims

1. A compound represented by the following structural formula (I):



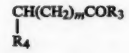
(I)

wherein R_1 is C_8 to C_{13} alkyl, C_7 to C_{12} alkoxy, C_7 to C_{12} alkylthio, C_{10} to C_{12} 1 -alkynyl, 10-undecynyloxy, 11-dodecynyl, phenyl-C_4 to C_{10} alkyl, phenyl-C_3 to C_9 alkoxy, phenylthio-C_3 to C_9 alkyl with the phenyl optionally mono substituted with bromo, chloro, trifluoromethyl, C_1 to C_4 alkoxy, methylthio or trifluoromethylthio, furyl-C_4 to C_{10} alkyl, trifluoromethyl-C_7 to C_{12} alkyl or cyclohexyl-C_4 to C_{10} alkyl;

R_2 is hydrogen, bromo, chloro, methyl, trifluoromethyl, hydroxy, C_1 to C_4 alkoxy or nitro; or R_1 is hydrogen and R_2 is C_8 to C_{13} alkyl, C_7 to C_{12} alkoxy, C_7 to C_{12} alkylthio, C_{10} to C_{12} 1-alkynyl, 10-undecynyloxy, 11-dodecynyl, phenyl-C_4 to C_{10} alkyl, phenyl-C_3 to C_9 alkoxy, phenylthio-C_3 to C_9 alkyl with the phenyl optionally mono substituted with bromo, chloro, trifluoromethyl, C_1 to C_4 alkoxy, methylthio or trifluoromethylthio, furyl-C_4 to C_{10} 30 alkyl, trifluoromethylC_7 to C_{12} alkyl or cyclohexyl-C_4 to C_{10} alkyl;

q is 0, 1 or 2, with the proviso that any of R_1 and R_2 above are not alkylthio or phenylthioalkyl when q is 1 or 2;

Y is COR_3*l*,



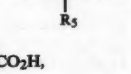
or $(CH_2)_{0-1}$-tetrozol-5-yl;

R_3 is hydroxy or amino;

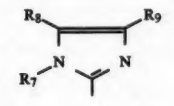
R_4 is hydrogen, methyl, flouro;

m is 0 or 1;

R is



$CH(CO_2H)CH_2CO_2H$,



n is 0 to 6;

R_5 is hydrogen, amino, or $NHCOCH_2CH_2CH(NH_2)CO_2H$;

R_6 is hydroxy, amino, or $NHCH_2CO_2H$;

Z is SO_3H, SO_2NH_2 or CN;

R_7 is hydrogen, C_1 to C_4 alkyl of C_3 to C_4 alkenyl;

R_8 is hydrogen, C_1 to C_4 alkyl, carboxyl or carboxamido, or $(CH_2)_pCO_2H$, wherein p is 1 or 2, when R_7 and R_9 are hydrogen or C_1 to C_4 alkyl; and

R_9 is hydrogen, C_1 to C_4 alkyl or CH_2CO_2H, with the proviso that when n is 0, R_5 is hydrogen and further that R_7, R_8 and R_9 are not all hydrogen; or a pharmaceutically acceptable salt thereof.

30. A method of treating a pulmonary disease in which leukotrienes are a factor in a subject in need thereof comprising administration to such subject an effective amount of a compound of claim 1.

4,874,793

USE OF PROTRIPTYLINE FOR THE TREATMENT OF MENTAL HEALTH PROBLEMS IN CHILDREN

Darrell Franks, 325 West Ormsby, Louisville, Ky. 40203

Filed Jul. 29, 1988, Ser. No. 226,133
Int. Cl.[4] A61K *31/135*
U.S. Cl. 514—656 4 Claims

1. A method of treating attention deficit syndrome or attention deficit disorder in children which comprises administering orally to said children a therapeutically effective amount of the chemical compound N-methyl-5H-dibenzo[a,d]cycloheptene-5-propylamine hydrochloride.

4,874,794

INFLAMMATORY DISEASE TREATMENT

David H. Katz, La Jolla, Calif., assignor to Lidak Biopharmaceuticals, La Jolla, Calif.

Filed Apr. 28, 1989, Ser. No. 345,084
Int. Cl.[4] A61V *31/045*
U.S. Cl. 514—724 2 Claims

1. A method treating virus-induced and inflammatory diseases of skin and membranes in humans or animals, comprising topical application of a composition consisting of one or more of the aliphatic alcohols docosanol, tetracosanol and hexacosanol in a concentrration of from 0.1 to 25 percent by weight in a physiologically compatible carrier to the inflalmed skin or membrane of the patient to be treaated.

4,874,795

COMPOSITION FOR DELIVERY OF ORALLY ADMINISTERED DRUGS AND OTHER SUBSTANCES

David W. Yesair, P.O. Box 347, Byfield, Mass. 01922

Continuation-in-part of Ser. No. 718,876, Apr. 2, 1985, abandoned. This application Mar. 24, 1986, Ser. No. 843,058
Int. Cl.[4] A61K *31/07, 47/00*
U.S. Cl. 514—725 17 Claims

1. A nonaqueous composition for oral administration to an individual, to enhance absorption of a fat-soluble drug incorporated therein, comprising:

a. at least one non-esterified fatty acid having 14–18 carbon atoms and at least one monoglyceride which is a monoester of glycerol and a fatty acid having 14–18 carbon atoms, said fatty acid and said monoglyceride comprising from about 70.0 mole percent to about 99.0 mole percent of the composition and being present in the composition in a molar ratio of fatty acid: monoglyceride of from about 1:2 to about 2:1;

b. lysophosphatidyl choline in which the fatty acid moiety has 14–18 carbon atoms, said lysophosphatidyl choline comprising from about 1.0 mole percent to about 30.0 mole percent of the composition; and a fat-soluble drug.

4,874,796

EXPANDABLE THERMOPLASTIC RESIN BEADS

Richard B. Allen, Pittsfield, Mass.; William E. Gibbs, Chesapeake, Va., and Lynn M. Hans, Pittsfield, Mass., assignors to General Electric Company, Pittsfield, Mass.

Division of Ser. No. 62,004, Jun. 12, 1987, Pat. No. 4,782,098. This application Aug. 16, 1988, Ser. No. 232,900
Int. Cl.[4] C08J *9/18, 9/20*
U.S. Cl. 521—59 8 Claims

1. An interpolymer in foam form having a density of less than about 20 lbs./ft.^{3}, wherein said interpolymer is a blowing agent imbibable composition comprising from 1 to 50 parts by weight of a polyphenylene ether resin and from 99 to 50 parts by weight of a polymerized vinyl aromatic monomer per 100 parts by weight of resin and monomer, wherein said blowing agent is an easily volatilizable hydrocarbon or halogenated hydrocarbon.

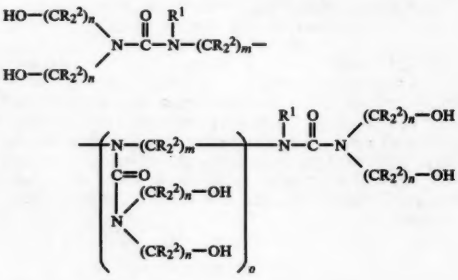
4,874,797

OLIGOUREA POLYOLS, POLYETHER POLYOLS PRODUCED FROM THEM AND THE USE OF THESE POLYOLS IN THE ISOCYANATE POLYADDITION PROCESS

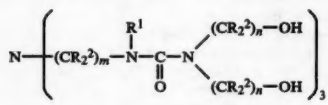
Peter Haas, Haan; Claus-Dieter Sommerfeld, Much, and Hans-Ulrich Weber, Monheim, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Filed Oct. 1, 1986, Ser. No. 914,110
Claims priority, application Fed. Rep. of Germany, Oct. 8, 1985, 3535861; Mar. 18, 1986, 3608962
Int. Cl.[4] C08G *18/00, 18/14, 18/32*
U.S. Cl. 521—167 15 Claims

1. A polyhydroxyalkyl oligourea corresponding to formula I



or corresponding to formula II



wherein

the radicals R^1, which may be the same or different, represent hydrogen or a C_1–C_4-alkyl radical, provided that when o is equal to zero the radicals R^1 cannot represent hydrogen, but can form together a C_2–C_5-alkylene radical, in which case m is 2 or 3,

the radicals R^2, which may be the same or different, represent hydrogen or a C_1–C_4-alkyl radical,

n is an integer from 2 to 6,

m is an integer from 2 to 10 and

o is an integer from 0 to 6.

4,874,798

PHOTOCOPOLYMERIZABLE COMPOSITIONS BASED ON EPOXY AND HYDROXYL-CONTAINING ORGANIC MATERIALS AND SUBSTITUTED CYCLOALIPHATIC MONOEPOXIDE REACTIVE DILUENTS

Joseph V. Koleske, Charleston, W. Va., and George T. Kwiatkowski, Green Brook, N.J., assignors to Union Carbide Corporation, Danbury, Conn.

Continuation of Ser. No. 464,571, Feb. 7, 1983, abandoned. This application Nov. 18, 1985, Ser. No. 798,363

The portion of the term of this patent subsequent to Jun. 3, 2003, has been disclaimed.

Int. Cl.[4] C08F *2/50, 224/00;* C08G *59/24, 59/62*

U.S. Cl. 522—31 12 Claims

1. A photocopolymerizable composition comprising a cycloaliphatic diepoxide, a polycaprolactone polyol, vinylcyclohexene monoepoxide and an onium salt photoinitiator.

4,874,799

AQUEOUS AKALINE DEVELOPABLE, UV CURABLE URETHANE ACRYLATE COMPOUNDS AND COMPOSITIONS USEFUL FOR FORMING LIQUID 100 PERCENT SOLIDS, SOLVENT-FREE SOLDER MASK COATINGS

Paul L. K. Hung, Edison, and Kenneth K. S. Tseng, Piscataway, both of N.J., assignors to M&T Chemicals Inc., Woodbridge, N.J.

Continuation-in-part of Ser. No. 735,411, May 17, 1985, Pat. No. 4,717,740. This application Jul. 10, 1987, Ser. No. 71,849

Int. Cl.[4] C08F *2/50, 20/58*

U.S. Cl. 522—96 30 Claims

1. A liquid, UV curable, aqueous alkaline developable urethane acrylate compound comprising the reaction product of two moles each of an aliphatic or cycloaliphatic diisocyanate and a hydroxy extended alkyl acrylate monomer formed by reaction of a hydroxyalkyl acrylate and caprolactone with one mole of an alkylene polyol having 3–6 hydroxyl groups and 3–6 carbon atoms, and at least one-half mole of a dicarboxylic acid or anhydride per mole of said polyol.

4,874,800

POLYESTER RESIN COMPOSITION

Tsuyoshi Minamisawa, Mishima; Katsunori Endo, Fuji; Eitaro Ikegami, Fuji, and Shigeru Nezu, Fuji, all of Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan

Filed Oct. 16, 1987, Ser. No. 108,962

Claims priority, application Japan, Oct. 17, 1986, 61-247098

Int. Cl.[4] C08K *9/04, 3/04*

U.S. Cl. 523—205 17 Claims

1. A polyester composition comprising a blend of a polyester having an anisotropic phase, 1 to 70 percent by weight, based on the composition, of a filler and 0.05 to 10 percent by weight, based on the filler, of a polyamide, wherein prior to blending with the polyester, the surface of the filler is treated with the polyamide, or the polyamide is added to the filler.

4,874,801

POLYMER BLEND

Eric R. George, Houston; Richard L. Danforth, Missouri City, and Paul S. Byrd, Houston, all of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 21, 1987, Ser. No. 135,428

Int. Cl.[4] C08K *7/14, 9/06, 5/08, 101/06*

U.S. Cl. 523—214 14 Claims

1. A composition comprising a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon of from 2 to 20 carbon atoms inclusive and a copolymer of ethylene and an α,β-ethylenically unsaturated carboxylic acid, said α,β-ethylenically unsaturated carboxylic acid having up to 10 carbon atoms, reinforced with alkali metal silicate glass fibers, wherein:

(a) the linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon is present in an amount from about 45% by weight to about 98% by weight, based on total reinforced composition;

(b) the copolymer of ethylene and an α,β-ethylenically unsaturated carboxylic acid is present in an amount from about 1% by weight to about 15% by weight based on total reinforced composition; and

(c) the glass fibers are present in an amount from about 1% by weight to about 40% by weight, based on total reinforced composition.

4,874,802

POLYCARBONATE COMPOSITIONS RESISTANT TO GAMMA RADIATION

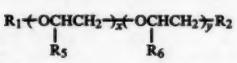
Charles E. Lundy; Sivaram Krishnan, both of Pittsburgh, and Gerard E. Reinert, McMurray, all of Pa., assignors to Mobay Corporation, Pittsburgh, Pa.

Filed Jun. 16, 1988, Ser. No. 207,601

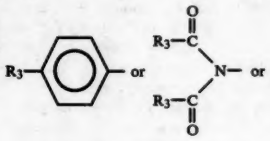
Int. Cl.[4] C08K *5/34*

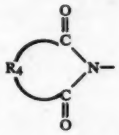
U.S. Cl. 524—94 6 Claims

1. A polycarbonate molding composition comprising a homogeneous blend of (i) an aromatic polycarbonate resin and (ii) a stabilizing agent conforming to



where R_1 and R_2 independently denote





where

R_3 is a hydrogen atom, a branched or linear C_1–C_{20} alkyl or a C_1–C_{20} cycloalkyl, R_5 and R_6 independently are a hydrogen atom or a C_1–C_3 alkyl radical,

x is an integer of about 1 to 70,

y is an integer of about 0 to 70,

R_4 is C_2–C_6 alkyl or cycloalkyl, C_6–C_{10} aryl or C_7–C_{20} alkylaryl or cycloalkylaryl, said (ii) being present in the composition in an amount sufficient to render the composition improved resistance to gamma radiation.

4,874,803

DIANHYDRIDE COUPLED POLYMER STABILIZERS

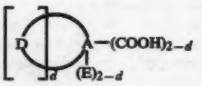
Arthur L. Baron, Getzville; Terry N. Myers, Williamsville, and Jerome Wicher, West Seneca, all of N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.

Filed Sep. 21, 1987, Ser. No. 99,192

Int. Cl.[4] C08K *3/34, 5/47;* C07D *403/10, 487/06*

U.S. Cl. 524—94 24 Claims

1. A polymer stabilizer compound having a general formula



D is divalent radical —C(=O)—N(G)—C(=O)—$(CH_2)_x$—, where X is 0 or 1,

E is monovalent radical —$(CH_2)_x$—C(=O)NH—G, where x is 0 or 1,

d is 0, 1 or 2,

A is an organic tetravalent radical of 2 to 48 carbons, when A is a non-aromatic tetravalent radical, two groups of two valences on adjacent carbon atoms are present to accommodate the one or two D diradical or diradicals and/or the one or two E monovalent radical or radicals and/or the one or two COOH group or groups; and when A is an aromatic tetravalent radical, two groups of two valences in ortho or peri position are present to accommodate the one or two D diradical or diradicals and/or the E monovalent radical or radicals and/or the COOH group or groups, and

G is a monovalent stabilizer radical selected from the group consisting of (a) hindered phenol-substituted amido, (b) hindered amine-substituted amido, (c) dialkyl sulfide-substituted amido, (d) a compound selected from the group consisting of 2-hydroxybenzophenone-substituted amido and 2-hydroxy-benzophenone-substituted alkyl, (e) a compound selected from the group consisting of 2-(2-hydroxyphenyl)-2H-henzotriazole-substituted amido and 2-(2-hydroxyphenyl)-2H-benzoptriazole-substituted alkyl, (f) secondary aromatic amine-substituted amido, (g) a compound selected from the group consisting of benzimidazole-substituted amido and benzothiazole-substituted amido, (h) oxanilide-substituted amido, (i) halogenated aromatic-substituted amido, and mixtures thereof.

18. A polymer composition comprising a synthetic polymer which is subject to thermal, oxidative or actinic light degradation and an effective amount for stabilization of the stabilizer compound of claim 1.

4,874,804

HOT MELT ADHESIVES BASED ON ETHYLENE-N-BUTYL ACRYLATE

Francis X. Brady, Whitehouse Station, and Thomas F. Kauffman, Phillipsburg, both of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Division of Ser. No. 64,261, Jun. 19, 1987, Pat. No. 4,816,306.
This application Aug. 24, 1988, Ser. No. 235,577
Int. Cl.[4] C08L *23/08, 33/08, 91/06*
U.S. Cl. 524—100 **9 Claims**

1. Hot melt adhesive compositions consisting essentially of:

(a) 35 to 45% by weight of at least one ethylene n-butyl acrylate copolymer containing 25-45% by weight n-butyl acrylate and having a melt index of at least 50;

(b) 35 to 55% of a terpene phenolic tackifier having a Ring and Ball softening point of at least about 110° C.; and

(c) 10 to 20% by weight of a polyethylene or Fischer-Tropsch synthetic wax having a melting point above about 100° C.;

said adhesive characterized by a viscosity of less than 4000 cps at 175° C., fiber tearing bonds from Kraft paper within the complete range of −18° C. to 70° C., a Ring and Ball softening point of 105°–115° C., a cloud point less than 120° C., clarity at 175° C. and less than a 10% viscosity change after 72 hours at 175° C. with no char, skinning or gel formation.

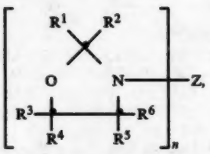
4,874,805

NOVEL OXAZOLIDINES

Rolf Mülhaupt, Marly, Switzerland, and Hubert Simon, Mulhouse, France, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

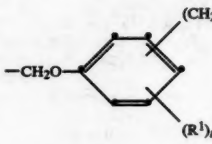
Division of Ser. No. 70,741, Jul. 6, 1987, Pat. No. 4,772,716.
This application Jun. 29, 1988, Ser. No. 212,853
Claims priority, application Switzerland, Jul. 14, 1986, 2817/86
Int. Cl.[4] C08K *5/54*
U.S. Cl. 524—188 **3 Claims**

1. A moisture-curing epoxide or polyurethane resin containing at least one compound of formula I



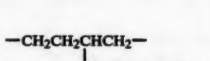
(I)

in which R^1 is hydrogen, C_1–C_{12}-alkyl, C_5–C_7-cycloalkyl, phenyl or benzyl and R^2 is hydrogen or C_1–C_4-alkyl, or R^1 and R^2, together with the C atom to which they are attached, form a 5-membered or 6-membered ring, and R^3, R^4, R^5 and R^6 are identical or different and are hydrogen, C_1–C_{12}-alkyl, phenyl which is unsubstituted or monosubstituted to trisubstituted by C_1–C_4-alkyl, halogen or C_1–C_4-alkoxy, or is a group of the formula —CH_2OR^7 (II) in which R^7 is C_1–C_{12}-alkyl, phenyl which is unsubstituted or monosubstituted to trisubstituted by C_1–C_4-alkyl, halogen or C_1–C_4-alkoxy, or is —C(O)—R^8, and R^8 is C_1–C_{12}-alkyl, and additionally not more than two of the radicals R^3, R^4, R^5 and R^6 are one or two groups of the formula —$CH_2CH_2Si(OR^9)_3$ (III), —$CH_2OC(O)CH_2CH_2Si(OR^9)_3$ (IV), —$CH_2O(C_mH_{2m})Si(OR^9)_3$ (V) or



(VI)

in which R^9 is C_1–C_4-alkyl or phenyl and m is a number from 1 to 8 and r is a number 1 or 2 and t is 0, 1 or 2 and R^1 is as defined above, or in addition, compounds of the formula I in which R^4 and R^5 together form a group of the formula



(VII)

in which R^9 is as defined above and R^3 and R^6 in this case are hydrogen, n is 1 or 2, and, when n is 1, Z is the organic radical of a primary amine ZNH_2 without the NH_2 group, and, when n is 2, Z is the divalent organic radical of a diprimary diamine NH_2ZNH_2 without the two NH_2 groups; subject to the proviso that the compound of formula I contains one to three—$Si(OR^9)_3$ groups.

4,874,806

EMULSION PAINT

Peter D. Kay, Hartlepool, and Keith McDonald, Middlesbrough, both of England, assignors to Tioxide Group PLC, London, England

Filed Jul. 13, 1988, Ser. No. 218,216

Claims priority, application United Kingdom, Jul. 25, 1987, 8717667

Int. Cl.[4] C08K 5/16; C08L 31/04, 31/02; C07F 7/28

U.S. Cl. 524—204 17 Claims

1. An emulsion paint which comprises an aqueous dispersion of a film-forming polymer and a titanium chelate comprising the reaction product of a titanium orthoester, a glycol or glycol ether, an alkanolamine and an alpha-hydroxy carboxylic acid.

4,874,807

SELF-LUBRICATING THERMOPLASTIC RESIN WEAR PART

Toshihiko Endo, and Nobuyuki Matsunaga, both of Fuji, Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan

Filed May 6, 1988, Ser. No. 191,304

Claims priority, application Japan, May 8, 1987, 62-112074

Int. Cl.[4] C08K 5/54

U.S. Cl. 524—267 3 Claims

1. A self-lubricating wear part having improved anti-friction and anti-frictional noise characteristics formed of a thermoplastic resin composition which consists essentially of (i) between 99.9 to 80.0 parts by weight of a thermoplastic polyester or polyacetal resin, and (ii) a self-lubricating effective amount between 0.1 to 20 parts by weight of a silicon oil having a viscosity of 150,000 cSt or more.

4,874,808

CYCLOOLEFIN TYPE RANDOM COPOLYMER COMPOSITIONS AND USES THEREOF

Syuji Minami, 2-2 Misono 1-chome, Ooctake-shi, Hiroshima; Keiji Kawamoto, 30-6 Ajina 4-chome, Hatsukaichi-shi, Hiroshima; Tetsuji Kasai, 4-3 Wakicho, Waki 2-chome; Toshiaki Kuroiwa, 4-2 Wakicho, Waki 2-chome, both of Kuga-gun, Yamaguchi, and Akira Todo, 5 Yushudainishi 2-chome, Ichihara-shi, Chiba, all of Japan

Filed Apr. 29, 1988, Ser. No. 188,490

Claims priority, application Japan, May 1, 1987, 62-106354; May 8, 1987, 62-110630

Int. Cl.[4] C08K 5/13, 5/10; C08L 23/08, 45/00

U.S. Cl. 524—291 8 Claims

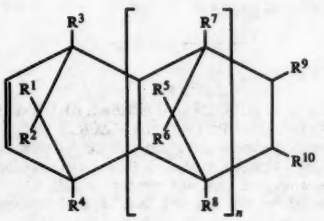
1. A cycloolefin type random copolymer composition characterized by comprising

(A) cycloolefin type random copolymer containing an ethylene component, and a cycloolefin component represented by the following general formula [I] or [II] and having an intrinsic viscosity [η] of 0.05–10 dl/g as measured at 135° C., in decalin and a softening temperature (TMA) not lower than 70° C., and

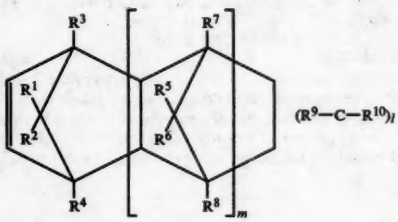
(B) a cycloolefin type random copolymer containing an ethylene component, and a cycloolefin component represented by the following general formula [I] or [II] and having an intrinsic viscosity [η] of 0.01–5 dl/g as measured at 135° C. in decalin and a softening temperature (TMA) not lower than 70° C., the weight ratio of said (A) component/(B) component ranging from 100/0.1 to 100/10.

General formula

[I]



[II]



wherein n and m are each 0 or a positive integer, l is an integer of at least 3, and R^1 to R^{10} each represent hydrogen atom, halogen atom or hydrocarbon group.

4,874,809

REINFORCED POLYESTERS, ARTICLE THEREOF AND METHOD OF MAKING LOW WARPAGE ARTICLES

Gerald T. Keep, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 25, 1988, Ser. No. 148,242

Int. Cl.[4] C08L 67/02

U.S. Cl. 524—449 1 Claim

1. A reinforced polyester composition useful in the production of a molded article of low warpage, said composition comprising

(a) about 55% to about 99%, based on total polyester weight, of poly(ethylene terephthalate),

(b) about 1% to about 45%, based on total polyester weight, of the homopolymer poly(cyclohexanedimethylene terephthalate),

(c) about 5% to about 50%, based on the total weight of the composition, of glass fibers, and

(d) about 5% to about 50%, based on the total weight of the composition, of mica

the total glass fiber and mica weight being less than 75% based on the total weight of the composition.

4,874,810

IMPACT MODIFIED POLYPHENYLENE ETHER-POLYAMIDE COMPOSITIONS

Gim F. Lee, Jr., Albany, N.Y.; Jean M. Heuschen, Halsteren, and Roelof Van Der Meer, Jan Van Goyenstraat, both of Netherlands, assignors to General Electric Company, Selkirk, N.Y.

Continuation-in-part of Ser. No. 837,474, Mar. 7, 1986, abandoned. This application Mar. 6, 1987, Ser. No. 22,856

Int. Cl.[4] C08L 53/02, 71/04, 77/00

U.S. Cl. 524—505 20 Claims

1. A thermoplastic composition comprising:

A. 100 parts by weight of a base resin comprising a compatibilized polyphenylene ether resin and polyamide resin,

B. 1 to 30 parts by weight per 100 parts of base resin A. of a selectively hydrogenated diblock copolymer of the A-B

type wherein block A is an alkenyl aromatic polymer and block B is an ethylene-propylene polymer, and

C. 5 to 45 weight percent of glass fibers based upon the weight of components A., B., and C. taken together.

4,874,811

ALKALINE AQUEOUS UNIVERSAL ADHESIVE CONTAINING POLY(METH-)ACRYLATE

Jürgen Borchers, Laatzen, and Petra Bubolz, Garbsen, both of Fed. Rep. of Germany, assignors to Pelikan Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Continuation of Ser. No. 132,503, Dec. 14, 1987, abandoned. This application Apr. 21, 1989, Ser. No. 342,699

Claims priority, application Fed. Rep. of Germany, Dec. 12, 1986, 3642498

Int. Cl.[4] C08L *39/00*

U.S. Cl. 524—516 19 Claims

1. An alkali aqueous universal poly(meth-)acrylate based adhesive which consists essentially of an aqueous solution of 5 to 40% by weight of a mixture of a poly(meth-)acrylate having a free carboxyl group and a degree of esterification of 0.55 to 0.85 and polyvinylpyrollidone in a weight ratio of 10:1 to 1:5.

4,874,812

SINGLE-COMPONENT POLYRETHANE COATING MASS

Günter Müller, Thun, Switzerland; Rolf Nagel, Baden-Baden, Fed. Rep. of Germany, and Jurg Stahli, Steffisburg, Switzerland, assignors to Metallogal AG, Bern, Switzerland

Filed Mar. 2, 1988, Ser. No. 162,926

Claims priority, application European Pat. Off., Mar. 9, 1987, 87103328.8

Int. Cl.[4] C08L *75/04*

U.S. Cl. 524—712 10 Claims

1. A single-component polyurethane coating mass applicable in a dry layer up to 2000 microns thick having a non-aromatic isocyanate component, said isocyanate component comprising:

a mixture containing about 50 to about 67 wt. % of an isocyanate selected from the group consisting of aliphatic di- and polyisocyanate and about 33 to about 50 wt. % of an isocyanate selected from the group consisting of cycloaliphatic di- and polyisocyanates.

4,874,813

PROTEINS BOUND TO A MARKER OR SOLID PHASE SUPPORT MATRIX USING A HYDRAZONE LINKAGE

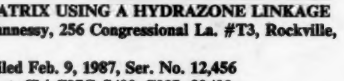
Daniel J. O'Shannessy, 256 Congressional La. #T3, Rockville, Md. 20852

Filed Feb. 9, 1987, Ser. No. 12,456

Int. Cl.[4] C07G *7/00;* C08L *89/00*

U.S. Cl. 525—54.1 28 Claims

1. A composition having the formula:



wherein:

SP is a solid phase support matrix or marker molecule;

R_1 is a linking group;

R_2 is a spacer arm having a chain of at least six atoms, with at least one of said atoms being a tertiary amine which is protonated at a pH less than about eight, and the remaining of said atoms being carbon, oxygen, or nitrogen; and

P is a protein.

4,874,814

CROSS-LINKED POLYVINYL BUTYRAL

George E. Cartier, Springfield, and Peter H. Farmer, Longmeadow, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 751,116, Jul. 2, 1985, abandoned. This application Feb. 27, 1989, Ser. No. 316,564

Int. Cl.[4] C08F *8/00*

U.S. Cl. 525—61 7 Claims

1. Polyvinyl butyral lightly cross-linked through stable intermolecular linkages wherein the extent of cross-linking is adequate to increase the viscosity of the polyvinyl butyral by about 2% to about 85% over its viscosity in the absence of such linkages said polyvinyl butyral containing 70 to 95 weight % vinyl butyral units.

4,874,815

ABS COMPOSITIONS HAVING TRIMODAL RUBBER PARTICLE DISTRIBUTIONS

Robert A. Bubeck; Robert B. Clipper, and David E. Henton, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 697,379, Feb. 1, 1985, abandoned. This application Sep. 8, 1987, Ser. No. 96,247

Int. Cl.[4] C08L *51/04*

U.S. Cl. 525—71 10 Claims

1. An improved rubber-modified, impact resistant polymeric composition comprising:

(a) a matrix comprising an interpolymer, said interpolymer being polymerized from a monovinylidene aromatic monomer and an ethylenically unsaturated nitrile monomer; and

(b) dispersed in said matrix, in the form of discrete particles, from about 6 to about 40 weight percent, based on total polymeric composition weight, of elastomeric material wherein the improvement consists of the dispersed elastomeric material comprising the following three different grafted rubber components:

(1) a component of small, emulsion polymerized particles, being from about 10 to about 90 weight percent of the total elastomeric material and having a volume average diameter from about 0.05 micron to about 0.25 micron;

(2) a component of small, mass polymerized particles, being from about 5 to about 85 weight percent of the total elastomeric material, and having a volume average diameter from about 0.5 micron to about 3.0 microns; and

(3) a component of large, mass polymerized particles, being from about 5.0 to about 50 weight percent of the total elastomeric material, and having a volume average diameter which is at least two times greater than the volume average diameter of the small mass polymerized particle, said volume average diameter of the large mass polymerized particle being from about 1.0 micron to about 10 microns.

4,874,816

VINYL COPOLYMERS WITH GRAFTED-ON POLYCARBONATE CHAINS, THEIR PRODUCTION AND USE

Ralf Dujardin; Wolfgang Ebert; Rolf-Volker Meyer; Klaus Berg, all of Krefeld; Ulrich Grigo, Kempen, and Wolfgang Wehnert, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed May 13, 1988, Ser. No. 194,648

Claims priority, application Fed. Rep. of Germany, May 22, 1987, 3717172

Int. Cl.[4] C08L *69/00*

U.S. Cl. 525—146 3 Claims

1. A mixture of

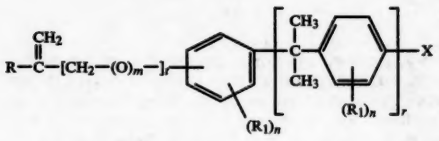
(A) 70 to 20% by weight of a thermoplastic aromatic poly-

carbonate based on diphenols corresponding to the following formula

(II)

in which Z is a single bond, a C_1–C_8 alkylene radical, C_2–C_{12} alkylidene radical, a cyclohexylidene radical, a benzylidene radical, a methylbenzylidene radical, a bis-(phenyl)-methylene radical, —S—, —SO_2—, —CO— or —O—, having $\overline{M}w$ values (weight average molecular weights determined in known manner via the relative solution viscosity) of 15,000 to 120,000 and

(B) 30 to 80% by weight of a thermoplastic polystyrene having an $\overline{M}w$ value (weight average molecular weight determined in known manner by gel permeation chromatography) of 20,000 to 400,000, characterized in that they contain 0.5% by weight to 15% by weight, based on 100% by weight of (A)+(B), of a vinyl copolymer with a grafted-on polycarbonte chain of which the vinyl copolymer graft base has a number average molecular weight as determined by gel permeation chromatography of 45,000 to 95,000 and the polycarbonate chain has a degree of polycondensation of recurring carbonate structural units of 35 to 70 and in which the ratio by weight of vinyl copolymer graft base to grafted on polycarbonate chain is between 35% by weight to 65% by weight an 55% by weight to 45% by weight, characterized in that 95 mol % to 99.5 % of styrene and 5 mol % to 0.5 mol % of compounds corresponding to the following formula



(I)

in which R is a hydrogen atom or C_1–C_4-alkyl, R_1 is Cl, Br, C_1–C_4-alkyl, cyclohexyl or C_1–C_4-alkoxy, m is 0 or 1, n is 0, 1 or 2, r is 0 or 1, t is 0 or 1 and x is —O—$Si(CH_3)_3$, are copolymerized in known manner by radically initiated mass polymerization to a number average molecular weight of 45,000 to 95,000 and the polymer is subsequently reacted without isolation with diphenols, phosgene and monophenols under the conditions of the two-phase interfacial process in aqueous alkaline phase with addition of an inert organic solvent, the quantity of diphenol being selected so that the content of polycarbonate chain in the grafted vinyl copolymer is between 65% and 45% by weight based on the total weight of the grafted vinyl copolymer, including grafted-on polycarbonate chain and the quantity of said monophenols being gauged so that the average chain length of the grafted-on polycarbonate chain comprises 35 to 70 recurring carbonate structural units and the quantity of inert organic solvent having to be gauged in such a way that the final viscosity of the organic phase of the reaction mixture is between 5 and 25 mPa.s.

4,874,817

COMPOSITIONS OF IMIDIZED ACRYLIC POLYMERS AND POLYAMIDES

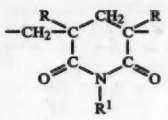
Harold K. Inskip, Newark, and Marion G. Waggoner, Hockessin, both of Del., assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 376,230, May 7, 1982, abandoned. This application Mar. 23, 1983, Ser. No. 476,092

Int. Cl.[4] C08L *77/00*

U.S. Cl. 525—183 **7 Claims**

1. A molding blend comprising about 40–95 volume percent of a polyamide resin of molecular weight of at least 15000 and complementally, about, 60–5 volume percent of an imidized acrylic resin, said imidized acrylic resin containing at least 10% by weight recurring imide units of the formula



wherein R is hydrogen or hydrocarbyl of 1–20 carbon atoms; and R_1 is —CH_3 or H.

4,874,818

PRIMER COMPOSITIONS

Shosaku Yamamoto; Kazuo Kakinuma; Hiroshi Ishioka, all of Yokohama; Fumio Sodeyama, Chigasaki; Junji Mayumi, Tsu City, and Riichiro Maruta, Yokkaichi, all of Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo, Japan

Filed Jul. 28, 1987, Ser. No. 78,854

Claims priority, application Japan, Aug. 21, 1986, 61-194076

Int. Cl.[4] C08L *31/02, 35/06*

U.S. Cl. 525—183 **2 Claims**

1. A primer composition consisting essentially of a polycaprolactone graft copolymer having a primary hydroxyl group, said copolymer being obtained by graft-polymerizing a styrenebutadiene-styrene block copolymer or it hydrogenated copolymer with a ring opened polymer of ϵ-caprolactone and a hydroxyl group-containing acrylic or methacrylic ester, said composition having a grafting ratio of said ring opened polymer within the range of 0.5–50% by weight.

4,874,819

POLYMER BLEND

Eric R. George, Houston, Tex.; Robert G. Lutz, Santa Rosa, Calif., and Edgar J. Smutny, Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 135,429, Dec. 21, 1987, abandoned. This application Jun. 8, 1988, Ser. No. 203,960

Int. Cl.[4] C08L *23/00, 33/02, 101/06*

U.S. Cl. 525—185 **13 Claims**

1. A composition comprising a non-miscible blend of a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon of from 2 to 20 carbon atoms inclusive and an ethylene-α,β-ethylenically unsaturated carboxylic acid copolymer, said α,β-ethylenically unsaturated carboxylic acid having up to 10 carbon atoms, wherein the amount of said ethylene-α,β-ethylenically unsaturated carboxylic acid copolymer is 0.01% to 35% by weight based on the total blend.

4,874,820

COPOLYMER COMPOSITIONS CONTAINING A NARROW MWD COMPONENT AND PROCESS OF MAKING SAME

Charles Cozewith, Westfield; Shiaw Ju, Edison, and Gary W. Verstrate, Matawan, all of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 840,562, Dec. 26, 1985, which is a continuation-in-part of Ser. No. 681,951, Dec. 14, 1984, abandoned, which is a continuation-in-part of Ser. No. 504,582, Jun. 15, 1983, Pat. No. 4,540,753. This application Dec. 27, 1985, Ser. No. 813,725

Int. Cl.[4] C08L *23/16, 23/18, 23/26*

U.S. Cl. 525—240 9 Claims

1. An ethylene alpha-olefin copolymer composition comprising:

(a) a first copolymer having at least one of $\overline{M}w/\overline{M}n$ less than 2 and $\overline{M}_z/\overline{M}_w$ less than 1.8; and

(b) a second copolymer having $\overline{M}_w/\overline{M}_n$ greater than or equal to 2, wherein said first copolymer is an ethylene alpha-olefin copolymer formed of monomers comprising 3–18 carbon atoms, wherein 95 weight percent of the copolymer chains of the first copolymer have an ethylene composition that differs from the average weight percent ethylene composition of the first copolymer by not more than 15 weight percent, and wherein at least 2 portions of essentially each copolymer chain of the first copolymer, each portion comprising at least about 5 weight percent of the chain, differ in composition from one another by at least about 5 weight percent ethylene.

4,874,821

BLOCK COPOLYMER AND PROCESS FOR PREPARING IT

Enrico Agostinis, Milan; Sergio Custro, Ravenna, and Alessandro Zazzetta, Cesena, all of Italy, assignors to Enichem Elastomeri S.p.A., Palermo, Italy

Filed Nov. 5, 1987, Ser. No. 117,631

Claims priority, application Italy, Jul. 31, 1987, 21563 A/87

Int. Cl.[4] C08F *297/04*

U.S. Cl. 525—271 8 Claims

1. Linear copolymer consisting of four alternating blocks, endowed with a good balance between mechanical properties, rheologic properties and properties of resistance to thermooxidation, having the following general formula:

B1-A1-B2-A2

wherein:

B1 and B2 are polydienic blocks, and

A1 and A2 are polyvinylaromatic blocks, having a weight average molecular weight of from 30,000 to 250,000, and a global content of monomer butadiene units of from 40 to 80% by weight, wherein the weight average molecular weight of B1 block is from 0.1 to 0.5 times the weight average molecular weight of B2 block, and the weight average molecular weight of A1 block is from 0.25 to 2.0 times the weight average molecular weight of A2 block, and which furthermore contains between B1 and A1 blocks a copolymer moiety formed by randomly linked monomer dienic and vinylaromatic units, characterized in that said copolymer moiety represents from 5 to 15% of the weight of the total copolymer.

4,874,822

PROCESS FOR THE ACRYLAMIDOACYLATION OF ALCOHOLS

Jerald K. Rasmussen; Steven M. Heilmann; Larry R. Krepski, and Dean M. Moren, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 7, 1988, Ser. No. 178,507

Int. Cl.[4] C08F *8/30;* C07C *102/00, 103/133*

U.S. Cl. 525—279 22 Claims

1. A process comprising the steps of

(a) reacting an alkenyl azlactone, a hydroxy functional compound, and a catalytically effective amount of a bicyclic amidine or a trivalent phosphorus compound, and

(b) isolating the resulting acrylamide or methacrylamide functional monomer, oligomer, or polymer.

4,874,823

CHLORINATED POLYVINYL CHLORIDE-VINYL ACETATE COPOLYMERS HAVING GOOD LOW AND HIGH TEMPERATURE STABILITY

Bernard F. Cinadr, Brecksville, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Nov. 25, 1987, Ser. No. 125,423

Int. Cl.[4] C08F *8/22*

U.S. Cl. 525—329.2 11 Claims

1. A chlorinated vinyl chloride-vinyl component type copolymer having low temperature stability, comprising:

the chlorinated vinyl chloride-vinyl component type copolymer, said copolymer containing from about 57 percent to about 65 percent by weight of chlorine therein, said copolymer containing from about 70 percent to about 95 percent by weight of vinyl chloride repeating units therein based upon the total number of vinyl chloride and vinyl component repeating units and, from about 5 percent to about 30 percent by weight of vinyl component repeating units therein based upon the total weight of vinyl chloride repeating units and vinyl component repeating units, said vinyl component repeating unit made from monomers of vinyl acetate, methyl acrylate, methyl methacrylate, vinylidene chloride, alpha-methylstyrene, styrene, acrylonitrile, and combinations thereof, said chlorinated polyvinyl chloride-vinyl acetate type copolymer having a stability of 120° C. for 20 minutes as measured by hydrogen chloride elimination of 0.0050 mole percent or less.

4,874,824

PROCESS FOR MANUFACTURING LOW-ACID, GLUTARIC-ANHYDRIDE-CONTAINING COPOLYMERS

Michael P. Hallden-Abberton, Maple Glen; Leslie A. Cohen, Langhorne, Pa., and Robert S. Wood, Holland, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

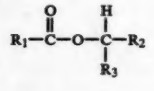
Filed Nov. 23, 1987, Ser. No. 123,683

Int. Cl.[4] C08F *8/00*

U.S. Cl. 525—379 19 Claims

1. A process for preparing thermoplastic copolymers of glutaric anhydride and (meth)acrylic ester, which process comprises reacting

(a) a (meth)acrylic ester polymerized from monomers having the formula



wherein R_1 is $CH_2{=}CH{-}$ or $CH_2{=}C(CH_3){-}$,

and R_2 and R_3 are independently selected from among H,

alkyl, cycloalkyl, aryl, alkaryl and aralkyl groups, the total of carbon atoms in R_2 and R_3 being from 0 to 21, with (b) a secondary amine selected from among dialkylamines, diarylamines and alkylarylamines, at a temperature of from about 150° to about 400° C., and subsequently isolating the polymer product.

4,874,825

POLYMER BLEND OF CARBON MONOXIDE OLEFIN COPOLYMER AND POLYETHER ESTERAMIDE POLYMER

William P. Gergen, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jun. 20, 1988, Ser. No. 208,437
Int. Cl.[4] C08G 67/02
U.S. Cl. 525—425 13 Claims

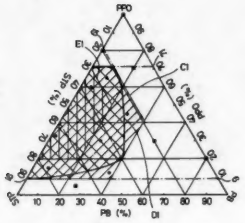
1. A composition comprising a non-miscible blend of, as a major component, a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon and, as a minor component, a polyether esteramide polymer.

4,874,826

METHOD OF PREPARING POLYPHENYLENE OXIDE COMPOSITION AND LAMINATES USING SUCH COMPOSITIONS

Takaaki Sakamoto, Yawata; Munehiko Itoh, Kobe, and Shuji Maeda, Yawata, all of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 896,964, Sep. 21, 1987, which is a continuation of Ser. No. 840,753, Mar. 18, 1986, abandoned. This application Feb. 19, 1988, Ser. No. 157,936
Claims priority, application Japan, Mar. 25, 1985, 60-61542; Mar. 25, 1985, 60-61543; Mar. 25, 1985, 60-61544; Mar. 25, 1985, 60-61545; Mar. 25, 1985, 60-61546; Mar. 25, 1985, 60-61547; Mar. 25, 1985, 60-61548; Jun. 15, 1985, 60-130158
Int. Cl.[4] C08F 283/00
U.S. Cl. 525—534 44 Claims



1. A method of preparing a film-forming polyphenylene oxide composition, comprising: mixing from above 7 and below 93 weight % of polyphenylene oxide, above 7 and below 93 weight of a setting means selected from the group consisting of a crosslinking monomer, a crosslinking polymer, and mixtures thereof, and an initiator; and allowing said setting means and said initiator to crosslink so as to provide said composition with the ability to form a film.

4,874,827

PRODUCTION OF HIGHLY-DISPERSIBLE WATER-SOLUBLE POLYMERS

Ratana Kanluen, Guelph, and Brigitte H. Licht, Burlington, both of Canada, assignors to Hart Chemical Limited, Guelph, Canada

Continuation-in-part of Ser. No. 169,115, Mar. 9, 1988, abandoned, which is a continuation of Ser. No. 2,997, Jan. 13, 1987. This application Aug. 24, 1988, Ser. No. 235,505
Int. Cl.[4] C08F 2/00
U.S. Cl. 526—214 14 Claims

1. A process for preparing a highly-dispersible particulate water-soluble polymer having a molecular weight in the range of about 50,000 to about 15,000,000, which comprises:

forming an aqueous reaction mixture comprising at least one vinyl monomer having a concentration of about 30 to about 70 wt. %, at least one surfactant selected from the group consisting of anionic, non-ionic and cationic surfactants in an amount of about 50 to about 15,000 ppm based on the weight of monomer, at least one ultraviolet light-decomposable free-radical initiator in an amount of about 40 to about 200 ppm based on the weight of monomer, at least one heat-decomposable free-radical initiator in an amount of about 50 to about 500 ppm based on the weight of monomer, and at least one chain transfer agent in an amount of about 5 to about 25,000 ppm based on the weight of monomer;

sequentially polymerizing said monomer solution by first irradiating with long wavelength ultraviolet radiation to activate said ultraviolet light-decomposable free radical initiator, and when said monomer mixture reaches a temperature which activates said heat-decomposable initiator, discontinuing said irradiation and allowing the polymerization to continue to completion; and

particulating the resulting polymer to produce a water-dispersible particulate water-soluble polymer having resistance to agglomeration and gel formation upon contact with water.

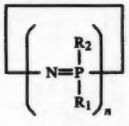
4,874,828

HEAT RESISTANT THERMOSETTING PHOSPHAZENE-IMIDE COPOLYMERS

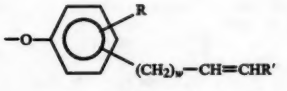
Alexander Lakacs, III, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Oct. 1, 1987, Ser. No. 104,150
Int. Cl.[4] C08F 222/40
U.S. Cl. 526—262 4 Claims

2. A crosslinked thermoset polymer which comprises a heat-catalyzed reaction product of a bis-maleimide based dienophile and a cyclophosphazene having the general formula:



where n is 3 or 4 and R_1 and R_2 are the same of different and are selected from the group consisting of:



(a)

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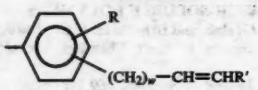
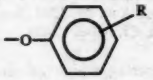
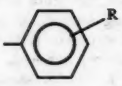


(b)



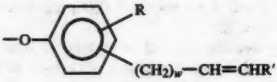
(c)

and

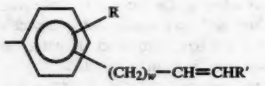


(d)

where w=0 or 1, and R and R' are H or a nonreactive moiety, and the average degree of substitution per cyclophosphazene ring by R_1 and R_2 radicals selected from the group consisting of:



(a)



(b)

is at least two.

4,874,829

PROCESS FOR PREPARING α-METHYLSTYRENE-ACRYLONITRILE POLYMERS

Chris E. Schwier, Northampton, and Wan C. Wu, Longmeadow, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed May 22, 1987, Ser. No. 53,222
Int. Cl.[4] C08F *212/12, 220/44*
U.S. Cl. 526—262 **7 Claims**

1. A method of forming a polymer of α-methylstyrene and acrylonitrile which comprises: polymerizing by free radical polymerization α-methylstyrene and acrylonitrile monomers, and optionally, in minor amount, one or more other monomers copolymerizable therewith, in a substantially uniform, homogenous reaction medium containing a concentration of unpolymerized α-methylstyrene which is lower by at least 5 weight % than the concentration of α-methylstyrene in the polymer being simultaneously formed, said monomers fed and said polymer withdrawn from the reaction medium continuously, the polymerization rate of said monomers being at least about 20% faster than the rate under azeotropic conditions.

4,874,830

ACRYLIC COPOLYMER AND SKIN PROTECTIVE

Izumi Saitoh, Hyogo; Shigeru Kido, Osaka; Yoshio Sasaki, and Syuichiro Shinohara, both of Fukui, all of Japan, assignors to Shionogi & Co., Ltd., Osaka and Nisshin Chemical Co., Ltd., Fukui, both of, Japan

Filed Oct. 19, 1987, Ser. No. 109,619
Claims priority, application Japan, Oct. 23, 1986, 61-253071; Oct. 23, 1986, 61-253072
Int. Cl.[4] C08F *120/12*
U.S. Cl. 526—318.4 **4 Claims**

1. A skin-protective acrylic copolymer of ethyl acrylate and methacrylic acid wherein the weight ratio of ethyl acrylate to methacrylic acid is in a range between 75:25 and 95:5, said copolymer containing therein residual monomers in amounts of 50 ppm or less, but substantially no surfactants.

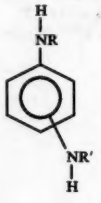
4,874,831

ROOM-TEMPERATURE-CURED POLYURETHANES AND POLYUREAS

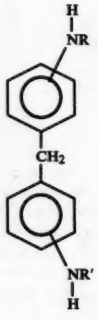
David W. House, Arlington Heights, and Ray V. Scott, Jr., Addison, both of Ill., assignors to UOP, Des Plaines, Ill.

Filed Jun. 17, 1988, Ser. No. 208,355
Int. Cl.[4] C08G *18/18*
U.S. Cl. 528—48 **32 Claims**

1. A method of coating an object of metal, masonry, glass, wood, or plastic comprising applying to a surface of said object a polyurethane or polyurea composition resulting from the reaction at ambient conditions of a polyol or polyamine, a polyisocyanate and a primary amine-free curing composition comprising an aromatic alkyl-substituted secondary polyamine having a structure selected from the group consisting of



(1)



(2)

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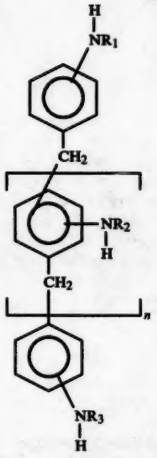


where each alkyl group R, R', R_1, R_2 and R_3 may be independently selected, R_2 and one of R_1 and R_3 may also be H and contains from 1 to about 20 carbon atoms, in the presence of a catalytic composition comprising an aliphtic carboxylic acid and an organometallic catalytic compound.

4,874,832

MICROCAPSULES HAVING POLYURETHANE WALLS

Gert Jabs, Odenthal, Fed. Rep. of Germany, and Adolf Richartz, Apapa, Nigeria, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 105,853, Oct. 7, 1987, abandoned. This application Dec. 9, 1988, Ser. No. 282,182

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1986, 3635822

Int. Cl.[4] C08G *18/30*

U.S. Cl. 528—60 **8 Claims**

1. A single walled microcapsule having a single polyurethane containing in which at least 50% of the capsule wall consists of a polyurethane which is obtained by reacting a diisocyanate and/or polyisocyanate with a polyether polyol which contains at least one tertiary amino group.

4,874,833

COMPOSITION CONTAINING EPOXY RESIN AND ALKYL HINDERED POLYAROMATIC DIAMINE AND MONOAROMATIC AMINE CURING AGENTS

Jacqueline A. Kershaw, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Aug. 22, 1988, Ser. No. 234,712

Int. Cl.[4] C08L *63/10*

U.S. Cl. 528—90 **20 Claims**

1. A curable epoxy resin composition comprising
(a) a low viscosity liquid epoxy resin;
(b) an alkyl hindered aromatic primary diamine curing agent having at least two aromatic rings.
(c) an amine cure accelerator;
(d) a liquid monoaromatic primary amine curing agent;
(e) at least one reactive ethylenically unsaturated monomer; and
(f) a peroxide polymerization initiator.

4,874,834

(3) **COLORLESS TRANSPARENT POLYIMIDE SHAPED ARTICLE AND PROCESS FOR PRODUCING THE SAME**

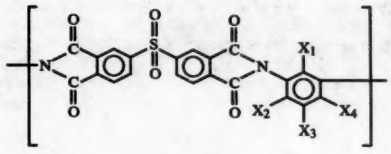
Kazumi Higashi, and Yuzuru Noda, both of Osaka, Japan, assignors to Nitto Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 6, 1987, Ser. No. 22,898

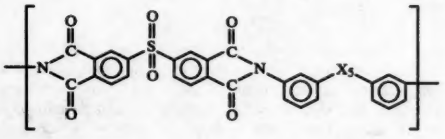
Int. Cl.[4] C08G *69/26*

U.S. Cl. 528—176 **11 Claims**

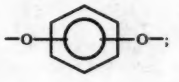
1. A colorless transparent polyimide shaped article comprising as a main component at least one recurring unit selected from the group consisting of a recurring unit represented by formula (I)



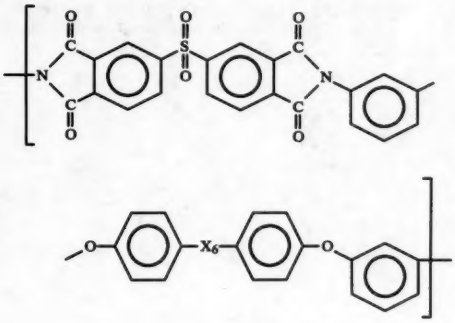
wherein X_1, X_2, X_3 and X_4, which may be the same or different, each represents —H, —CH_3, —C_2H_5, —NO_2, —F, —COOH or —Cl a recurring unit represented by formula (II)



wherein X_5 represents —O—, —SO_2—, —CH_2—, —S—, —CO— or



and
a recurring unit represented by formula (III)



wherein X_6 represents —SO_2—, —$C(CH_3)_2$— or —$C(CF_3)_2$—.

4,874,835

POLYETHERIMIDES AND PRECURSORS THEREFOR FROM OXYDIPHTALIC ANHYDRIDE DIESTER AND A MIXTURE OF DIAMINES

Donald R. Berdahl, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 95,982, Sep. 14, 1987, abandoned. This application Jul. 15, 1988, Ser. No. 223,746

Int. Cl.[4] C08G 73/10

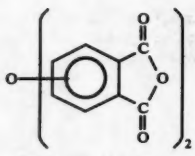
U.S. Cl. 528—179 17 Claims

1. A method for preparing a polyetherimide precursor composition which comprises blending, at a temperature up to about 50° C., reagents consisting of:

(A) a mixture of at least two diamines selected from the group consisting of m-phenylenediamine, p-phenylenediamine and 4-aminophenyl ether, each of said diamines being present in the amount of about 25–75 mole percent of said mixture; and

(B) the esterification product of the reaction of (B-1) at least one ether tetracarboxylic acid dianhydride of the formula

(I)



and (B-2) at least one alkanol of the formula R^1OH, wherein R^1 is a C_{1-4} primary or secondary alkyl radical; reagent B-2 being employed in the amount of about 10–20 moles per mole of reagent B-1; said esterification product being principally a tetracarboxylic acid diester with one carboxy group on each benzene ring esterified.

4,874,836

THERMOPLASTIC WHOLLY AROMATIC POLYIMIDE ESTERS AND PROCESS FOR PRODUCING THE SAME

Makoto Wakabayashi; Kenichi Fujiwara, and Hideo Hayashi, all of Chiba, Japan, assignors to Idemitsu Petrochemical Co., Ltd., Tokyo, Japan

Filed Oct. 26, 1988, Ser. No. 262,796

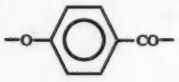
Claims priority, application Japan, Oct. 28, 1987, 62-270380; Jun. 2, 1988, 63-134484

Int. Cl.[4] C08G 69/44

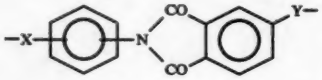
U.S. Cl. 528—185 10 Claims

1. A thermoplastic wholly aromatic polyimide ester consisting essentially of structural units represented by the general formulas I, II, III, and IV:

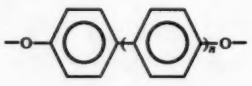
I



II



III



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IV

wherein X and Y are either —O— or —CO— and are either identical with or different from each other, n is an integer of 0 or 1, X group and imide group in unit II are present at para or meta position to each other, two carbonyl groups in unit IV are present at para or meta position to each other, and each end of units I, II, III, and IV is bonded to another end through ester bond,

and wherein the polyimide ester has a melt viscosity of 1.0 to 1.0×10^5 Pa·s measured at a shear stress of 0.025 MPa and a temperature of 300° to 400° C.

4,874,837

AMINATED HYDROXYLATED POLYESTER POLYOL RESIN AND MOLDING COMPOSITIONS COMPRISED THEREOF

James P. Bershas, Newark, Ohio, and Russell H. Tobias, Valparaiso, Ind., assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Jan. 11, 1988, Ser. No. 141,808

Int. Cl.[4] C08G 69/44; C08F 20/00

U.S. Cl. 528—291 17 Claims

1. An aminated, hydroxylated polyester polyol resin comprising the product of a reaction of:

(a) an acid anhydride selected from the group including maleic acid anhydride or a mixture of maleic acid anhydride and a polyfunctional acid anhydride having at least 2 functional hydroxyl groups;

(b) a low molecular weight polyether polyol having a molecular weight of about 100 to about 600 selected from the group including diethylene glycol or a mixture of diethylene glycol and at least one other polyether polyol having a molecular weight of about 100 to about 600; wherein (a) and (b) are reacted together to form a prepolymer;

(c) a lower alkylene oxide having from 2 to 4 carbon atoms; wherein the prepolymer is reacted with (c) to form an unsaturated polyester intermediate resin; and,

(d) a mono- or di-functional amino compound selected from the group including diethanolamine or a mixture of diethanolamine and at least one mono- or di-functional amino compounds containing at least one isocyanate reactive group attached to the nitrogen of the mono- or di-functional amino compound; wherein the Michael Addition Reaction is used to add (d) across double bonds of the unsaturated polyester intermediate resin to form the aminated, hydroxylated polyester polyol resin.

4,874,838

LIQUID CRYSTAL COPOLYETHERS FROM 7-OXA-BICYCLO-(2,2,1)-HEPTANE

Leonardo Fiore, Milan; Giuseppe Motroni, Novara, and Mauro Maritano, Como, all of Italy, assignors to Montedison S.p.A., Milan, Italy

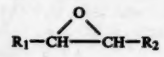
Filed Sep. 11, 1987, Ser. No. 95,596

Claims priority, application Italy, Sep. 15, 1986, 21697 A/86

Int. Cl.[4] C08G 65/08, 65/24

U.S. Cl. 528—408 7 Claims

1. Copolyethers displaying anisotropic liquid-crystal properties in the molten state consisting of copolymers of 7-oxa-bicyclo(2,2,1)heptane, optionally substituted in the 2-, 3-, 5-, and/or 6-positions with alkyl radicals having 1 or 2 carbon atoms, with one or more single ring cycloaliphatic ether(s) having the formulae:



(II)

wherein R_1 and R_2 are equal to or different from each other and represent H, a halogen, an alkyl radical having 1 or 2 carbon atoms in which one or more hydrogen atoms are optionally replaced by halogens, a phenyl radical or a substituted phenyl radical, and wherein the 7-oxa-bicyclo(2,2,1)heptane is present in a molar amount from 80 to 98% in said copolyethers.

4,874,839

STABILIZATION OF POLY(ARYLENE ETHER KETONES)

Wayne Montoya, Newark, and Robert H. Reamey, Menlo Park, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Aug. 5, 1988, Ser. No. 229,082
Int. Cl.[4] C08F *6/00*
U.S. Cl. 528—480 **12 Claims**

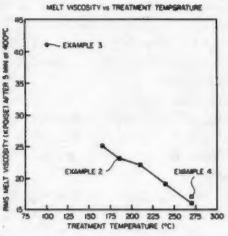
1. A method of stabilizing a poly(arylene ether ketone), comprising heating the poly(arylene ether ketone) at a temperature between about 240° C. and about 325° C. for a period of between about 0.5 and about 24 hours, prior to any melt-processing of the poly(arylene ether ketone).

4,874,840

STABILIZATION OF POLY(ARYLENE ETHER KETONES)

Paul Becker, San Bruno, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Filed Aug. 5, 1988, Ser. No. 229,083
The portion of the term of this patent subsequent to Oct. 17, 2006, has been disclaimed.
Int. Cl.[4] C08G *8/02, 14/00*
U.S. Cl. 528—480 **14 Claims**



1. A method of stabilizing a poly(arylene ether ketone) comprising the steps of:

(a) digesting the poly(arylene ether ketone) in an aqueous medium to remove polymerization solvent, and

(b) hydrothermally treating the poly(arylene ether ketone) by heating it to a temperature of at least 160°°C. while contacting it with water.

4,874,841

PARTICULATE POLYMER AND PREPARATION PROCESS THEREOF

Teruhiko Sugimori; Fumio Suzuki; Hideaki Habara, and Hiromasa Inada, all of Ohtake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Aug. 19, 1986, Ser. No. 898,018
Claims priority, application Japan, Aug. 21, 1985, 60-181820; Aug. 30, 1985, 60-191399
Int. Cl.[4] C08J *3/16*
U.S. Cl. 528—491 **8 Claims**

1. A process for preparing a particulate polymer by the agglomeration of polymer particles contained in a polymer latex obtained by emulsion polymerization, said polymer being a 5-80 wt. % elastomer component containing copolymer and said particulate polymer being composed of primary particles and/or secondary particles, said primary particles being in the form of a compact mass substantially free of voids and having particle sizes of at least 20 μm and said secondary particles being formed by the agglomeration of at least some of said primary particles, which process comprises:

mixing by stirring or shaking a mixture of the polymer latex having a solids content of 5–60 wt. % with an amount of a coagulant sufficient to coagulate the polymer latex and an organic liquid having low solubility in water and being capable of dissolving at least one homopolymer of the individual monomers constituting the polymer which solvent is a member selected from the group consisting of aromatic hydrocarbons, alkyl substituted derivatives thereof, halogenated hydrocarbons and isobutyl ketone, wherein the volume proportion of the polymer in the entire mixture is 3% or higher and the organic liquid is mixed in an amount of 3–40 parts by weight per 100 parts by weight of the polymer solids container in the polymer latex.

4,874,842

PROCESS FOR CURING THERMOSETTING RESINS BY MEANS OF A LIQUID HEAT TRANSMITTER

Ken Johns, Asford, Great Britain; Alberto Re, and Gianangelo Bargigia, both of Milan, Italy, assignors to Ausimont S.p.A., Milan, Italy

Filed Apr. 13, 1988, Ser. No. 180,892
Claims priority, application Italy, Apr. 17, 1987, 20167 A/87
Int. Cl.[4] C08G *59/14*
U.S. Cl. 528—494 **6 Claims**

1. A process for the thermal vulcanization of thermosetting resins or vulcanizable elastomers or polymers characterized in that an article to be vulcanized is brought into contact with a process liquid at a predetermined temperature for a time sufficient to obtain a complete vulcanization, said liquid belonging to the class of the perfluoropolyethers.

4,874,843

CHROMATOGRAPHIC PURIFICATION PROCESS

Patrick J. Baker, Greenwood, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Dec. 3, 1987, Ser. No. 128,351
Int. Cl.[4] C07K *1/14*
U.S. Cl. 530—317 **11 Claims**

1. A process for purifying fermentation products which comprises:

a. contacting an aqueous solution of a fermentation product with a non-functionalized macroporous copolymer of styrene and divinylbenzene in aqueous phase;

b. physically removing the water from the charged resin;

c. rewetting the charged resin with a polar organic solvent;

d. washing the resin with a polar organic solvent that is the same as or different than the polar organic solvent used in step (C) to remove non-uv impurities;

e. eluting the fermentation product from the non-functional resin by increasing the polarity of the solvent; and

f. recovering the fermentation product.

4,874,844

TRIPEPTIDE WITH IMMUNOSTIMULATING ACTIVITY

Brunetto Brunetti, Milan, and Marco Prada, Casalpusterlengo, both of Italy, assignors to Ellem Industria Farmaceutica S.p.A., Milan, Italy

Filed Apr. 6, 1987, Ser. No. 35,045

Claims priority, application Italy, Apr. 9, 1986, 20026 A/86

Int. Cl.[4] C07K *5/08*

U.S. Cl. 530—331 **3 Claims**

1. A tripeptide consisting of L-Arg (arginine), L-Lys (lysine) and L-Glu (glutamic acid) and having the following structure: Arg-Lys-Glu or a pharmaceutically acceptable salt thereof.

4,874,845

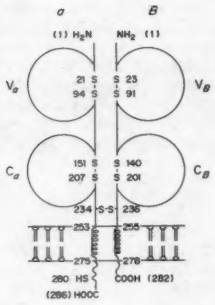
T LYMPHOCYTE RECEPTOR SUBUNIT

Haruo Saito, Arlington; David M. Kranz, Somerville; Herman N. Eisen, Waban, and Susumu Tonegawa, Chestnut Hill, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Jun. 13, 1984, Ser. No. 620,122

Int. Cl.[4] C07K *13/00*; C12P *21/00*; C12N *15/00*; C07H *15/12*

U.S. Cl. 530—395 **16 Claims**



5. A cDNA sequence sufficiently homologous to a nucleotide sequence encoding a polypeptide component of a mammalian T-lymphocyte receptor gamma subunit to be isolated by hybridization, said protein comprising a variable region having a cysteine residue, a constant region having two cysteine residues, a region joining the variable and constant region having a cysteine residue, a transmembrane region having predominantly cationic amino acids and a cysteine residue, having a molecular weight of 33,000 daltons and being devoid of N-X-S/T glycosylation sites when said protein is produced by an alloreactive Cytotoxic-T lymphocyte clone 2C of BALB.B origin and specific for the D end of the BALB/c H-2 complex (d haplotype).

8. The cDNA sequence of claim 5 wherein said sequence encodes a polypeptide component of a protein specific to the surface of a human T lymphocyte.

4,874,846

PROCESS FOR THE PREPARATION OF ARYLOXYBENZOIC ACIDS CONTAINING A SULFONAMIDE GROUP

Alain Chene, Lyon, France, assignor to Rhone-Poulenc Agrochimie S.A., Lyon, France

Continuation of Ser. No. 563,033, Dec. 19, 1983, abandoned. This application May 26, 1987, Ser. No. 54,411

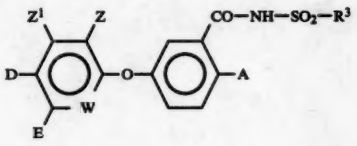
Claims priority, application France, Dec. 17, 1982, 82 21509; Feb. 17, 1983, 83 02807

Int. Cl.[4] C07B *45/04*

U.S. Cl. 534—560 **26 Claims**

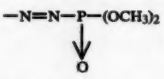
1. A process for preparing a 3-(phenoxy)-N-sulphonylbenzamide comprising reacting (i) the corresponding 3-phenoxybenzoic acid with (ii) a sulphonamide in liquid phase in the presence of a halogenating agent $POCl_3$, and in the absence of an acid acceptor, said reaction forming a hydrochloric acid and a 3-(phenoxy)-N-sulphonylbenzamide, said reaction taking place at a temperature such that the hydrochloric acid is removed progressively in gaseous form from the reaction medium as it is formed.

4. A process for preparing an end product compound having the formula:



wherein:

A is selected from: hydrogen; fluorine; chlorine; bromine; iodine; nitro; —N=NCF$_3$; PO_3H_2; PO_3-alkyl, the alkyl group having from 1 to 4 carbon atoms; NH_2; NHOH; $N^+{}_2$; a carboxyl group; a carboxylic alkyl ester; a carboxylic amide; a carboxylic salt; a monoalkylamino group; a dialkylamino group; NH—CO—R_1, wherein R^1 is selected from the group consisting of an alkyl radical, an alkoxy radical, a monoalkylamino group and a dialkylamino group; an alkyl group; a trialkyl-ammonium group; $NHSO_2R^2$ where R^2 is selected from the group consisting of alkyl and phenyl; $NHCONHSO_2R^2$; an alkylthio group; an alkylsulphinyl group; an alkylsulphonyl group; a cyanosulphonyl group; a hydroxyl group; an alkanoyloxy group; an alkoxy group; an alkoxy substituted by alkoxycarbonyl; SH; a nitroso group; —SCN; an azide group; CF_3;



and an acyl group;

Z is selected from: hydrogen; fluorine; chlorine; bromine; iodine; an alkyl group; an alkoxy group; an alkylsulphinyl group; an alkylsulphonyl group; CF_3; NO_2; cyano; NH_2; $NHCOR^1$; and $CONH_2$;

Z^1 is selected from: hydrogen; halogen; an alkylamino group and a dialkylamino group;

D is selected from: fluorine; chlorine; bromine; iodine; an alkylthio group; an alkylsulphinyl group; an alkylsulphonyl group; a halogenoalkyl group; a sulphamoyl group; a formyl group; an alkylcarbonyl group; cyano; and a dimethylamino group;

E is selected from: hydrogen; a halogenoalkyl group; an alkoxy group; an alkylsulphinyl group; an alkylsulphonyl group; cyano; NH_2; $CONH_2$; and NH—CO—R^1;

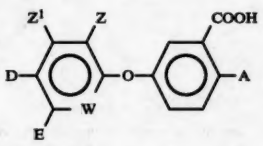
W is selected from the group consisting of trivalent nitrogen, and —C(G)=;

G is selected from the group consisting of hydrogen; fluorine; chlorine; bromine; iodine; an alkyl group; an alkoxy group; an alkylsulphinyl group; an alkylsulphonyl group; trifluoromethyl; nitro; cyano; NH_2; $HNCOR^1$; and $CONH_2$;

R_3 is selected from the group consisting of substituted or unsubstituted phenyl, said substituents selected from the group consisting of one or more halogens, alkyl and nitro; unsubstituted or substituted pyridyl, said substituents selected from the group consisting of one or more halogens, alkyl and nitro; unsubstituted or substituted thienyl, said substituents selected from the group consisting of one or more halogens, alkyl and nitro; an alkenyl or alkynyl

radical having two to four carbon atoms; an alkyl radical having one to four carbon atoms, said alkyl group being optionally substituted with one or more moieties selected from fluorine, chlorine, bromine, iodine, carboxyl, alkoxycarbonyl having two to five carbon atoms, alkylcarbonyl, having two to five carbon atoms, monoalkylcarbamoyl wherein said alkyl moeity has from one to four carbon atoms, dialkylcarbamoyl, wherein said alkyl moiety has from one to four carbon atoms, alkylthio having from one to four carbon atoms, alkylsulphinyl having from one to four carbon atoms, alkylsulphonyl, having from one to four carbon atoms, alkylcarboxyloxy having two to five carbon atoms, alkylcarbonylamino, having two to five carbon atoms, and cyano;

said process comprising reacting an acid compound having the formula:



with a compound having the formula $R^3—SO_2—NH_2$ in the presence of a halogenating agent, $POCl_3$, and in the absence of an acid acceptor, wherein said reactants comprise a reaction medium having a liquid phase, said reaction forming the desired end product compound and hydrochloric acid in gaseous form, said reaction taking place at a temperature sufficient to cause the gaseous hydrochloric acid to leave progressively from the reaction medium as it is formed without causing the decomposition of the reactants.

4,874,847

PROCESS FOR THE DIAZOTISATION OF PRIMARY AROMATIC AMINES WHICH ARE SPARINGLY SOLUBLE IN WATER

Rüdiger Oxenius, Rheinfelden, Fed. Rep. of Germany; Ernst Bürgi, Dornach, Switzerland; Vladimir Arnold, Basel, Switzerland, and Ferenc Rakoczi, Zurich, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 803,710, Dec. 2, 1985, abandoned. This application Dec. 22, 1987, Ser. No. 136,530

Claims priority, application Switzerland, Dec. 6, 1984, 5825/84

Int. Cl.⁴ C07C *113/04*

U.S. Cl. 534—565 **12 Claims**

1. A process for diazotizing weakly basic primary aromatic amines which are sparingly soluble in water, which comprises the steps of first preparaing a melt or solution of the amine in a water-soluble solvent at a temperature in the range from 30° C. to 150° C., precipitating said amine in the form of a reactive suspension consisting essentially of the free amine by adding said melt or solution to a stirred mixture of water, ice or a mixture thereof and an effective amount of a dispersant, and diazotizing said reactive suspension of the amine by reaction with a commercially available diazotizing agent in the temperature range from 10° to 100° C. for 0.1 to 20 minutes.

4,874,848

ASYMMETRICAL POLYAZO CHROMIUM COMPLEX DYES COMPRISING RESORCINOL AS A COUPLING COMPONENT

Gerhard Back, Lörrach, Fed. Rep. of Germany, and Fabio Beffa, Riehen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

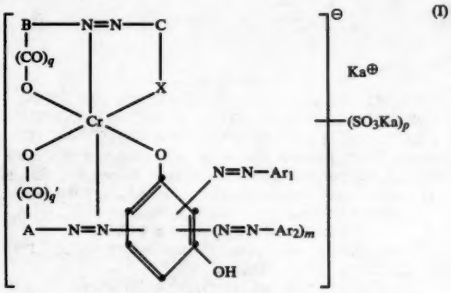
Continuation-in-part of Ser. No. 447,351, Dec. 6, 1982, abandoned. This application Jun. 4, 1986, Ser. No. 873,436

Claims priority, application Switzerland, Dec. 15, 1981, 7993/81

Int. Cl.⁴ C09B *45/06, 45/16, 45/26;* D06P *1/10*

U.S. Cl. 534—684 **13 Claims**

1. A chromium complex dye of the formula



in which

A is benzene or naphthalene which carries a hydroxyl or carboxyl group in o-position relative to the azo group, and which is unsubstituted or substituted by low molecular weight alkyl or alkoxy, halogen, notro, cyano, sulfo, carboxyl, phosphono, alkylsulfonyl, sulfamides or acylamino selected from the group consisting of low molecular weight alkanoylamino, low molecular weight alkylsulfonylamino, low molecular weight alkoxycarbonylamino, sulfonylamino, aroylamino and arylsulfonylamino,

B is benzene or naphthalene which carries a hydroxyl or carboxyl group in o-position relative to the azo group, and which is unsubstituted or substituted by the substituents mentioned for A,

C is a coupling component which contains the group X in o- or α-position relative to the azo group and apart from the group X there is no hydroxyl group or unsubstituted amino group if C is a phenol coupling component as defined below, the coupling component C being selected from the group consisting of phenols coupling in o-position and unsubstituted or substituted by low molecular weight alkyl or alkoxy, dialkylamino or acylamino which is C_1–C_4-alkanoylamino, C_1–C_4-alkylsulfonylamino, C_1–C_4-alkoxycarbonylamino, aroylamino or arylsulfonylamino; naphthols which are unsubstituted or substituted by C_1–C_4-alkyl or alkoxy, chlorine, amino, sulfo or acylamino which is as defined above; 5-pyrazolones or 5-aminopyrazoles each of which has in the 1-position phenyl or naphthyl which is unsubstituted or substituted by chlorine, nitro, C_1–C_4-alkyl or alkoxy groups or sulfo groups and which have in the 3-position a C_1–C_4-alkyl or carboxyl group; naphthylamines which are unsubstituted or substituted by sulfo, sulfonamido or sulfone groups; acetoacetamides which, if they contain an anilide nucelus, are unsubstituted in said nucleus or substituted by chlorine, bromine, nitro or C_1–C_4-alkyl, alkoxy or sulfo groups; 6-hydroxy-3-cyano- or 6-hydroxy-3-carboxamido-4-alkyl-2-pyridones which are substituted in the 1-position by unsubstituted C_1–C_4-alkyl, β-hydroxyethyl, β-aminoethyl or γ-isopropoxypropyl, or by phenyl, and are unsubstituted in the 4-position or are substituted there by a C_1–C_4-alkyl group, or hydroxyquinoles,

X is oxygen or a group of the formula —NR— in which R is hydrogen or a C_1–C_4-alkyl group,

Ar_1 and Ar_2 are the same or different and are independently of each other unsubstituted benzene or naphthalene or benzene which is substituted by chlorine, bromine, nitro, sulfo, sulfamoyl, N-monoalkylated or N,N-dialkylated sulfamoyl, alkylsulfonyl, alkyl or alkoxy, or naphthyl which is substituted by sulfo, or thiazolyl, benzothiazolyl, imidazolyl, quinolinyl, oxazolyl or benzoxazolyl,

m is 0 to 1,

q and q' independently of each other are 0 or 1,

p is an integer from 0 to 6, and

$Ka^{\oplus}$ is a cation.

4,874,849

ASYMMETRIC 1:2-CHROMIUM COMPLEX DYES CONTAINING TWO AZO DYES, ONE CONTAINING AN ACETOACETANILIDE COUPLING COMPONENT

Gerhard Back, Lörrach, Fed. Rep. of Germany; Fabic Beffa, Riehen, Switzerland; Ulrich Schlesinger, Binzen, Fed. Rep. of Germany, and Alois Püntener, Rheinfelden, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

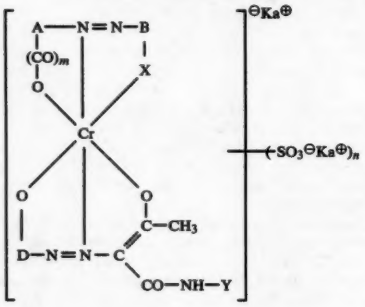
Filed Dec. 19, 1986, Ser. No. 944,621

Claims priority, application Switzerland, Dec. 23, 1985, 5517/85; Dec. 23, 1985, 5514/85

Int. Cl.[4] C09B *45/06, 45/16, 45/26, 45/48*

U.S. Cl. 534—696 **21 Claims**

1. A 1:2-chromium complex dye of the formula



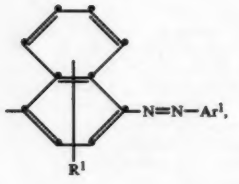
wherein

A and D are each independently of the other a benzene or naphthalene radical of a diazo component, which component carries the hydroxyl or carboxyl group in the ortho-position to the azo group;

B is the radical of a coupling component which carries the group X adjacent to the azo group;

X is oxygen or a radical of the formula —NR—, in which R is hydrogen or C_1–C_4alkyl;

Y is a radical of the formula



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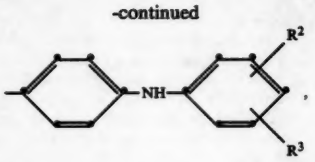
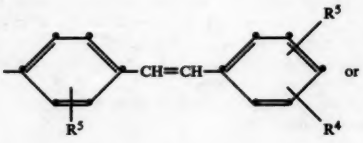
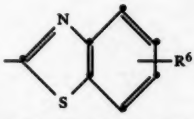






in which formulae R^1 and R^5 are each independently of the other hydrogen or sulfo, R^4 is hydrogen or nitro, R^6 is hydrogen, methyl, methoxy or chlorine and R^2 and R^3 are each independently of the other hydrogen, halogen, nitro or sulfo;

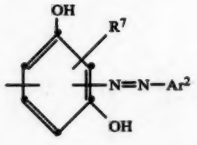
Ar^1 is a benzene or naphthalene radical which is unsubstituted or substituted by halogen, nitro, sulfo, C_1–C_4alkyl or C_1–C_4-alkoxy;

m is 0 or 1;

n is an integer from 1 to 7; and

Ka^+ is a cation;

with the proviso that if Y is phenylaminophenyl, B is a substituted resorcinol radical of the formula



wherein R^7 is hydrogen, C_1–C_4alkyl, halogen, carboxy or sulfo and Ar^2 is a benzene or naphthalene radical which is unsubstituted or substituted by halogen, nitro, sulfo, C_1–C_4-alkyl or C_1–C_4-alkoxy.

4,874,850

PHARMACEUTICAL PREPARATIONS

Henrich H. Paradies, Iserlohn, Fed. Rep. of Germany, assignor to Medice Chem.-Pharm. Fabrik Putter GmbH & Co., Fed. Rep. of Germany

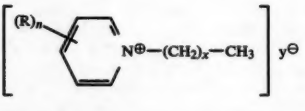
Filed Aug. 6, 1987, Ser. No. 83,463

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1986, 3626700

Int. Cl.[4] C07D *213/55, 213/68, 213/20;* **C08B** *37/04*

U.S. Cl. 536—3 **9 Claims**

1. A compound of the formula



in which R, n, and x are such that:

R is 4-OH, n is 1, and x is 8–20;

R is 4—{[$CH_3(CH_2)_m]_2CH$—} where m is 8–20, n is 1, and x is 0 or 8–20; or
R is 3,5—di—{$CH_3(CH_2)_m$—O—C(O)—} where m is 8–20, n is 2, and x is 0 or 8–20; and $y^{\ominus}$ is a monovalent anion.

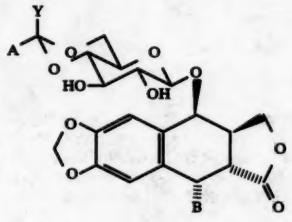
4,874,851

3',4'-DINITROGEN SUBSTITUTED EPIPODOPHYLLOTOXIN GLUCOSIDE DERIVATIVES

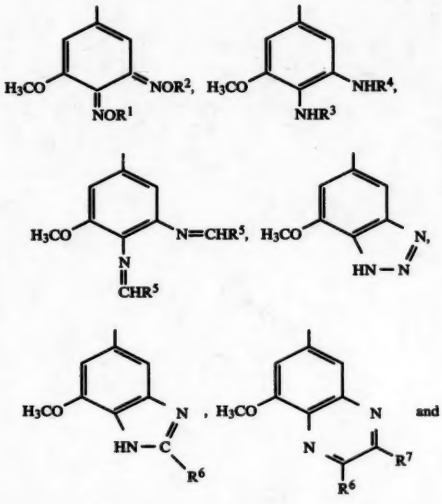
Dolatrai M. Vyas, Madison; Mark G. Saulnier, Middletown, and John F. Kadow, New Haven, all of Conn., assignors to Bristol-Meyers Company, New York, N.Y.

Filed Jul. 1, 1987, Ser. No. 68,376
Int. Cl.[4] C07H *15/24*
U.S. Cl. 536—17.2 **18 Claims**

1. A compound having the formula



wherein Y is H and A is selected from the group consisting of (C_{1-10})alkyl; (C_{2-10})alkenyl; (C_{5-6})cycloalkyl; 2-furyl; 2-thienyl; phenyl; and phenyl sustituted with one or more groups selected from halo, (C_{1-8})alkyl, (C_{1-8})alkoxy, hydroxy, nitro, and amino; or
A and Y are each (C_{1-8})alkyl; or
A and Y and the carbon to which they are attached join to form a (C_{5-6})cycloalkyl group and
B is selected from the group consisting of



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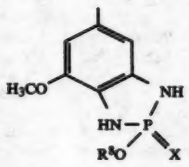


wherein R^1 and R^2 are independently selected from the group consisting of (C_{1-5})alkyl, phenyl, and phenyl(C_{1-5})alkyl; R^3 and R^4 are independently H, (C_{1-5})alkanoyl, or halo-substituted (C_{2-5})alkanoyl; R^5 is phenyl, phenyl substituted with one or more groups selected from (C_{1-5})alkoxy and nitro, or a heteroaryl selected from the group consisting of thienyl, furyl, and pyridyl; R^6 and R^7 are each H or (C_{1-5})alkyl; R^8 is (C_{1-5})alkyl; and X is oxygen or sulfur.

4,874,852

GLYCOSIDATION CATALUST AND PROCESS FOR PREPARING GLYCOSIDE DERIVATIVES

Keisuke Kinomura, Kakogawa; Sadaya Kitazawa, Himeji; Yasushi Takata, and Toshiyuki Sakakibara, both of Kobe, all of Japan, assignors to Nippon Fine Chemical Co., Ltd., Osaka, Japan

Division of Ser. No. 101,458, Sep. 28, 1987. This application Mar. 10, 1989, Ser. No. 321,809
Claims priority, application Japan, Sep. 29, 1986, 61-230485; Dec. 22, 1986, 61-307434
Int. Cl.[4] C07G *3/00, 17/00;* C07H *15/04;* B01J *27/14*
U.S. Cl. 536—18.6 **8 Claims**

1. A process for preparing a glycoside derivative by conversion of a saccharide compound to a glycoside derivative, characterized in that the reaction for conversion to glycoside is conducted in the presence of a catalyst comprising at least one of the heterapoly acids represented by the formula

$$H_aX_pM_qO_r{\cdot}bH_2O$$

wherein X is P, As,Si or Ge, M is at least one species selected from the group consisting of Mo, W and V, a is 3 4 or 6, b is an integer of 0 to 30, p is 1 or 2, q is 12 or 18, and r is 40 or 62, with the proviso that when x is P or As, a is 3 or 6; when X is Si or Ge, a is 4; and further (1) when X is P or As and a is 3, or when X is Si or Ge and a is 4, M is at least one species selected from the group consisting of Mo, W and V, p is 1, q is 12 and r is 40; and (2) when X is P or As and a is 6, M is Mo or W, p is 2, q is 18 and r is 62.

4,874,853

SYNTHETIC OLIGONUCLEOTIDES USEFUL IN DIAGNOSIS OF CHRONIC MYELOGENOUS LEUKEMIA

John J. Rossi, Glendora, Calif., assignor to City of Hope, Duarte, Calif.

Filed Apr. 18, 1988, Ser. No. 182,434
Int. Cl.[4] C07H *21/04*
U.S. Cl. 536—27 **4 Claims**

2. A synthetic oligonucleotide including the sequence

5' CTGAAGGGCTTTTGAACTCT 3'
abl / bcr 3

or the sequence

5' CCGTGAAGGGCTTCTTCCTTATTG 3'.
abl / bcr 2

4,874,854

LOW VISCOSITY HETEROPOLYSACCHARIDES

George T. Colegrove, San Diego, and Thomas A. Lindroth, Spring Valley, both of Calif., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Oct. 8, 1985, Ser. No. 785,624
Int. Cl.[4] C07G 17/001; C08B 37/00
U.S. Cl. 536—114 4 Claims

1. A low viscosity heteropolysaccharide wherein said heteropolysaccharide is xanthan gum or S-194 having a 5% (wt.) aqueous solution viscosity of 5–300 cP or guar gum having a 5% (wt.) aqueous solution viscosity of 15–100 cP as measured on a Brookfield LVT viscometer, at 25° C., spindle 2, 60 rpm.

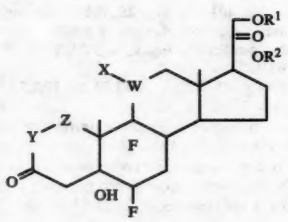
4,874,855

STEROID COMPOUNDS AND PROCESS OF PREPARING THE SAME

Hidetsugu Takagaki, Sakura; Masayoshi Abe, Chiba; Michihiro Watanabe, Ichihara; Kazuyuki Takeuchi, Sodegaura; Shigenori Nakanishi, Chiba; Yuuko Nakata, Tomakomai, and Keiji Yamazaki, Sakura, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan

Filed May 3, 1988, Ser. No. 189,849
Claims priority, application Japan, Nov. 4, 1987, 62-278931
Int. Cl.[4] C07J 1/00
U.S. Cl. 540—3 17 Claims

1. A steroid compound represented by general formula



(I)

wherein X and W together as >W—X represent a carbonyl group (>C=O) or a hydroxymethylene group (>CH(OH)), the hydroxy moiety of the hydroxymethylene group being of β-arrangement, and OR^1 and OR^2 independently represent an ester residue, and Y and Z together as —Y—Z— represent a —(PpSe)CH—CH_2— group where Pp represent a phenyl group or a 2-pyridyl group, or Y and Z each represent an ethenylene group or a 1-bromoethenylene group.

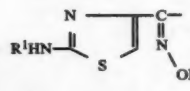
4,874,856

3-(SUBSTITUTED)PROPENYL-7-(AMINO-THIAZOLYLACETAMIDO) CEPH-3-EM-4-CARBOXYLIC ACIDS AND ESTERS THEREOF

Seiji Iimura; Yoshio Abe, both of Tokyo; Jun Okumura, Yokohama; Takayuki Naito, Kawasaki, and Hajime Kamachi, Chiba, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.

Continuation-in-part of Ser. No. 882,110, Jul. 3, 1986, abandoned, which is a continuation-in-part of Ser. No. 748,359, Jun. 24, 1985, Pat. No. 4,708,955. This application Aug. 17, 1987, Ser. No. 86,138
The portion of the term of this patent subsequent to Nov. 24, 2004, has been disclaimed.
Int. Cl.[4] C07D 501/46
U.S. Cl. 540—222 13 Claims

1. A compound of the formula



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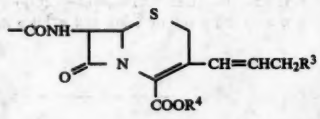


wherein

R^1 is hydrogen or a conventional amino-protecting group,

R^2 is hydrogen, or alkanoyl having 2 to 4 carbon atoms,

R^3 is hydrogen or lower alkanoyloxy having 2 to 3 carbon atoms, and when R^2 and R^3 are each hydrogen, R^4 is also hydrogen, and

R^4 is hydrogen, (5-methyl-2-oxo-1,3-dioxolen-4-yl)methyl, 1-(ethoxycarbonyloxy)ethyl, 1-(pivaloyloxy)ethyl, 1-(cyclohexylacetoxy)ethyl, or 1-(cyclohexyloxycarbonyloxy)ethyl.

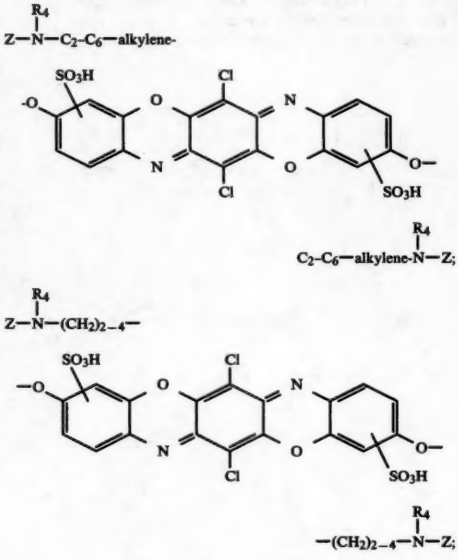
4,874,857

AMINOALKOXYTRIPHENDIOXAZINE DYESTUFFS USEFUL FOR DYEING AND PRINTING HYDROXYL- AND AMINO-CONTAINING MATERIALS

Wolfgang Harms, Leverkusen, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

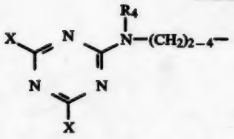
Filed Sep. 29, 1987, Ser. No. 102,460
Claims priority, application Fed. Rep. of Germany, Oct. 17, 1986, 3635312
Int. Cl.[4] C09B 19/00, 62/022; D06P 3/10, 3/66
U.S. Cl. 544—75 3 Claims

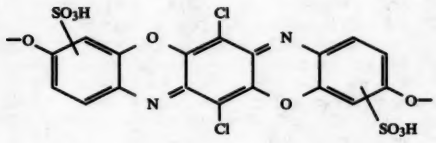
1. A dyestuff of the formula

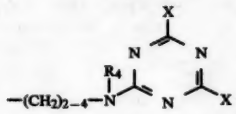


or

-continued







in which

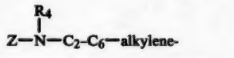
R_4=H, C_1–C_4-alkyl

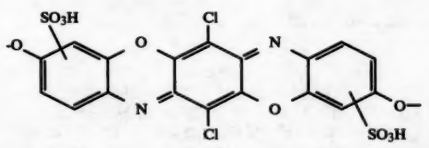
Z=fibre-reactive halogen-triazinyl or halogenpyrimidinyl radical,

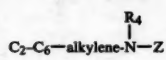
X=Cl, F and

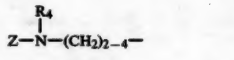
A=an aminobenzene or aminonaphthalene radical.

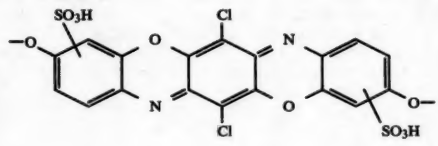
3. A dyestuff of the formula

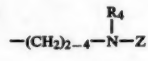












in which

R_4=H, C_1–C_4-alkyl

Z=H.

4,874,858

TRIAZINE-CONTAINING MULTISILANE COUPLING AGENTS FOR COATING GLASS FIBERS, FOR ADHESIVES, AND FOR PROTECTIVE COATINGS

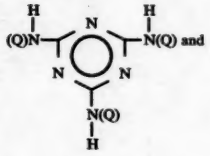
Angelo J. Magistro, Brecksville, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

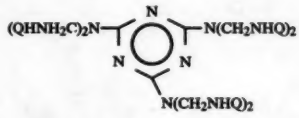
Filed Mar. 28, 1988, Ser. No. 173,898

Int. Cl.[4] C07D *251/54*

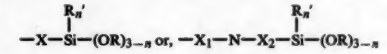
U.S. Cl. 544—196 **2 Claims**

1. A triazine-ring containing multisilane having a structure selected from





wherein Q represents



wherein X, X_1, and X_2 represents a divalent radical selected from the group consisting of C_1–C_{10} alkylene

and C_6–C_{20} aralkyl;

R represents C_1–C_5 lower alkyl;

R' represents H, C_1–C_8 alkyl, phenyl, or C_7–C_{18} aralkyl; and,

n has a value of 0 or 1.

4,874,859

DI-BISHYDROXYPROPYL CYANURIC ACID, TRISUBSTITUTED DERIVATIVES THEREOF AND A PROCESS FOR THEIR PREPARATION

Remy Teissier, Toulouse, and Serge Clamens, Tournefeuille, both of France, assignors to Societe Chimique des Charbonnages, Paris, France

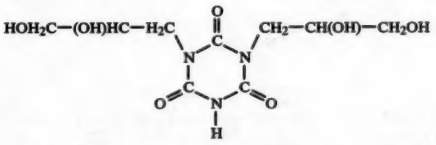
Filed Dec. 11, 1987, Ser. No. 131,793

Claims priority, application France, Dec. 11, 1986, 86 17329

Int. Cl.[4] C07D *251/04;* C08F *20/00, 283/04;* C08G *18/10*

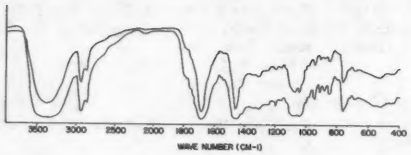
U.S. Cl. 544—221 **4 Claims**

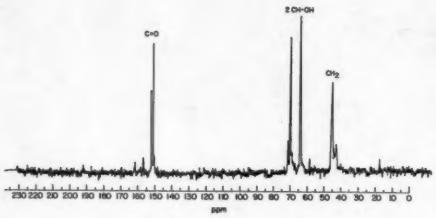
1. A trisubstituted derivative of cyanuric acid of the formula (II)

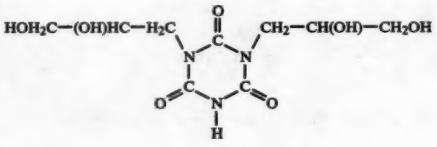


wherein R is an alkyl group containing a polymerizable ehtylenic functional group.

4. A cyanuric acid derivative of the formula (I)







4,874,860

PROCESS FOR PREPARING 1,3,5-TRIAZINETRIONES

Bernd Gallenkamp, Wuppertal; Andreas Günther, Cologne; Karl-Heinrich Mohrmann, Bergisch-Gladbach, and Thomas Schmidt, Haan, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

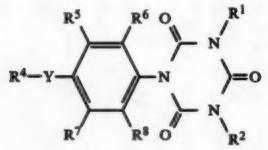
Continuation of Ser. No. 858,407, May 1, 1986, abandoned. This application Dec. 18, 1987, Ser. No. 136,253

Claims priority, application Fed. Rep. of Germany, May 9, 1985, 3516632

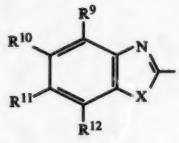
Int. Cl.[4] C07D *251/34*

U.S. Cl. 544—221 **2 Claims**

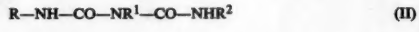
1. A process for preparing a 1,3,5-triazinetrione of the formula



in which R^4 stands for a phenyl which is optionally substituted by halogen, cyano, nitro, amino, alkyl, alkoxy, alkylthio, alkylsulphinyl, alkylsulphonyl, halogenoalkyl, halogenoalkoxy, halogenoalkylthio, halogenoalkylsulphonyl, hydroxycarbonyl, alkylcarbonyl, alkoxycarbonyl, aminocarbonyl, alkoxycarbonylamino and/or sulphonylamino or for the radical

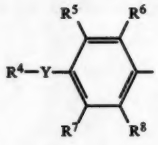


where R^9, R^{10}, R^{11} and R^{12} are identical or different and stand for hydrogen, halogen, alkyl, alkoxy, halogenoalkyl or halogenoalkoxy, X stands for oxygen, sulphur or a grouping —N=CH—, R^5, R^6, R^7 and R^8 are identical or different and stand for hydrogen, halogen, alkyl or alkoxy, Y stands for oxygen, sulphur or the groupings —CO—, —SO—, —SO_2—, —CH_2—, —CH_2O— or —OCH_2—, and R^1 and R^2 stand for hydrogen, halogen and optionally halogen-substituted C_1–C_6-alkyl, C_1–C_6-alkoxy, C_1–C_6-alkylthio and C_1–C_6-alkylsulphonyl and for optionally halogen-, C_1–C_2-alkyl-, C_1–C_2-alkoxy-, C_1–C_2-alkylthio-, halogeno-C_1–C_2-alkyl-, halogeno-C_1–C_2-alkoxy- and/or halogeno-C_1–C_2-alkylthio-substituted aryl having 6 to 10 carbon atoms, comprising reacting a biuret of the formula



R—NH—CO—NR[1]—CO—NHR[2] (II)

in which R is



with a dialkyl carbonate of the formula

$(R^3O)_2CO$ (III)

in which R^3 stands for alkyl, in the presence of sodium methylate and distilling off by-product alcohol.

4,874,861

PYRIDAZINONE DERIVATIVES, PREPARATION THEREOF, AND INSECTICIDAL, ACARICIDAL, NEMATICIDAL, FUNGICIDAL COMPOSITIONS

Tomoyuki Ogura; Yasuo Kawamura; Shigeru Ishii; Masatoshi Baba; Masakazu Taniguchi, all of Funabashi; Masayoshi Hirose, Shiraoka; Kiminori Hirata, Shiraoka, and Yoshinori Ochiai, Shiraoka, all of Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

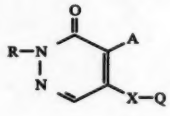
Continuation of Ser. No. 800,665, Nov. 22, 1985, abandoned. This application Nov. 30, 1987, Ser. No. 127,518

Claims priority, application Japan, Nov. 29, 1984, 59-252123; May 22, 1985, 60-109624

Int. Cl.[4] C07D *237/18, 237/16, 403/12, 401/12*

U.S. Cl. 544—229 **3 Claims**

1. A 3(2H)-pyridazinone of formula (I):

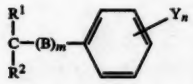


(I)

wherein,

A denotes a straight or branched C_1 to C_6 alkyl, R denotes a straight or branched C_1 to C_6 alkyl, X denotes oxygen or sulfur atom,

Q denotes a group:



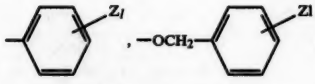
R^1 and R^2 denote each independently hydrogen, a lower alkyl, a lower haloalkyl, or 4-tert-butylphenyl,

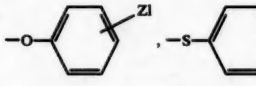
B denotes a $—CR^6=CR^7—$, $—CR^6R^7O—$ or

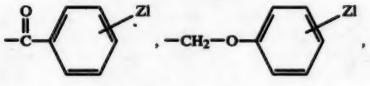
R^6 and R^7 denote each independently hydrogen or a C_1 to C_3 alkyl

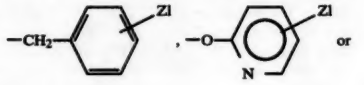
m is 0 or 1,

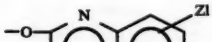
Y denotes hydrogen, a halogen, a C_1 or C_6 alkyl, a cycloalkyl, a cycloalkyloxy, a C_1 to C_6 alkyloxy, a C_1 to C_6 alkylthio, a C_1 to C_6 alkylsulfinyl, a C_1 to C_6 alkylsulfonyl, a lower haloalkyl, a lower haloalkyloxy, a lower haloalkylthio, a lower alkenyloxy, trimethylsilyl, a lower alkoxycarbonyl, dimethylamino, nitro, cyano, SCN,











(wherein, Z denotes a halogen, a lower alkyl, a lower alkoxy, a cycloalkyl, a lower haloalkyl, a lower alkoxycarbonyl or nitro and l is 1 or an integer of from 1 to 5, said Z being the same or different when l is an integer of 2 to 5),

n is an integer of from 1 to 5, said Y being the same or different when n is an integer of 2 to 5.

4,874,862

PROCESS FOR PREPARING GUANINE DERIVATIVES

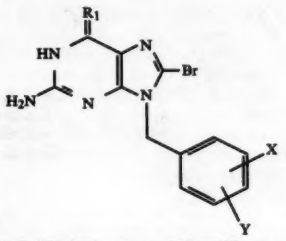
Jagadish C. Sircar; Catherine R. Brungardt, both of Ann Arbor, Mich., and Charles F. Schwender, Gladstone, N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 698,805, Feb. 11, 1985, which is a continuation-in-part of Ser. No. 593,063, Mar. 26, 1984, abandoned. This application Oct. 14, 1987, Ser. No. 108,658

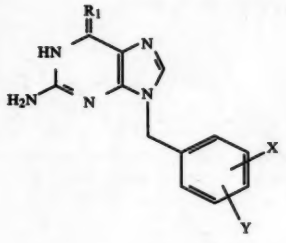
Int. Cl.[4] C07D *473/18*; A61K *31/52*

U.S. Cl. 544—276 **2 Claims**

1. A process for the preparation of a compound of the formula



wherein R_1 is O, Y is hydrogen, and X and Y are each independently halogen, alkyl of one to four carbon atoms, alkoxy of one to four carbon atoms, hydroxy, trifluoromethyl, CN, SO_nR_3, $COOR_3$ or NR_3R_4, in which n is 0, 1, 2 or 3 and or R_4 are each independently hydrogen or alkyl of one to four carbon atoms, which comprises treating a compound of the formula



with N-bromosuccinimide in an organic solvent.

4,874,863

BISNAPHTHALIMIDES

Miguel F. Brana; José M. C. Berlanga, both of Madrid, Spain; Gerhard Keilhauer, Dannstadt-Schauernheim, and Erich Schlick, Neuhofen, both of Fed. Rep. of Germany, assignors to Knoll AG, Ludwigshafen, Fed. Rep. of Germany

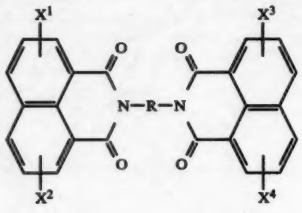
Filed Mar. 1, 1988, Ser. No. 162,490

Claims priority, application Fed. Rep. of Germany, Mar. 10, 1987, 3707651

Int. Cl.[4] C07D *221/14*

U.S. Cl. 540—99 **4 Claims**

1. A bisnaphthalimide of the formula



I

where X^1, X^2, X^3 and X^4 are identical or different and are each hydrogen, nitro, amino, C_1–C_6-alkylamino, di-C_1–C_6-alkylamino, hydroxyl, C_1–C_6-alkoxy, halogen, trihalomethyl, C_1–C_6-alkyl, formyl, C_1–C_6-alkylcarbonyl, ureyl, C_1–C_6-alkylureyl or C_1–C_6 alkylcarbonylamino and R is a straight chain or branched C_4–C_{10}-alkylene which is interrupted at one or two points in the chain by a secondary or tertiary amino group, where 2 nitrogen atoms may additionally be bonded to one another by an alkylene group, or a salt with a physiologically tolerated acid.

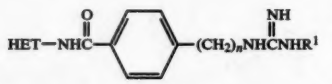
4,874,864

BENZAMIDE PROTEASE INHIBITORS

Rodney C. Schnur, Mystic, and Anton F. J. Fliri, Norwich, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Filed May 24, 1988, Ser. No. 197,927
Int. Cl.[4] C07D *215/16, 239/02, 285/08, 263/48*
U.S. Cl. 546—153 **3 Claims**

1. A compound of the formula



or a pharmaceutically acceptable salt thereof, wherein HET is quinol-8-yl, 6methoxyquinol-8-yl or quinol-3-yl n is an integer of 0 to 2; and R^1 is a hydrogen or (C_1–C_3)alkyl.

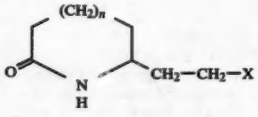
4,874,865

PREPARATION OF SUBSTITUTED LACTAMS

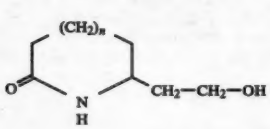
Ludwig Wambach, Heidelberg, and Martin Fischer, Ludwigshafen, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 2, 1988, Ser. No. 200,956
Int. Cl.[4] C07D *211/76, 207/26*
U.S. Cl. 546—243 **3 Claims**

1. A process for the preparation of a substituted lactam of the formula Ia, Ib or Ic

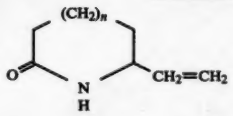


Ia



Ib

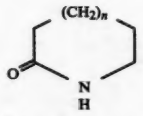
-continued



Ic

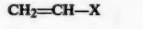
where n is 0 or 1 and X is one of the following groups
—O—CO—R^1
—O—SO_2—R^1
—CO—R^2
—CO—O—R^3
—CO—NR^4R^5
where R^1 is a radical of a carboxylic or sulfonic acid of 1 to 8 carbon atoms, R^2 is C_1–C_8-alkyl, R^3 is hydrogen or an alkyl, aryl or aralkyl group of not more than 8 carbon atoms and R^4 and R^5 are each hydrogen or C_1–C_4-alkyl and may furthermore be bonded to form a 5-membered or 6-membered ring, wherein

(a) for the preparation of Ia, a lactam of the formula II



II

is reacted at from 100° to 200° C. with a vinyl compound of the formula III



III

and a compound IV which forms free radicals,

(b) for the preparation of Ib, a compound Ia prepared as in part a above in which X is a (—O—CO—R^1) or (—O—SO_2—R^1) group is subjected to hydrolytic cleavage, and

(c) for the preparation of Ic from a compound Ib prepared as in part b above or from a compound Ia prepared as in part a above in which X is a (—O—CO—R^1) or (—O—SO_2—R^1) group, water or an acid R^1—COOH or R^1—SO_3H is eliminated by heating in the presence or absence of a catalyst.

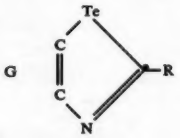
4,874,866

PHOTOGRAPHICALLY USEFUL CHALCOGENAZOLES, CHALCOGENAZOLINES, AND CHALCOGENAZOLINIUM AND CHALCOGENAZOLIUM SALTS

Wolfgang H. H. Gunther, Webster; Ronald E. Leone, and Rosemary Przyklek, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 660,155, Oct. 12, 1984, Pat. No. 4,576,905, which is a continuation-in-part of Ser. No. 529,829, Sep. 6, 1983, abandoned. This application Oct. 3, 1985, Ser. No. 783,727
Int. Cl.[4] C07D *293/12*
U.S. Cl. 548—100 **45 Claims**

1. A benzotellurazole or naphthotellurazole of the formula:



where

G completes a benzo or naphtho ring which is unsubstituted

or substituted with at least one substituent chosen from the group consisting of (a) a hydrocarbon linked directly or through a divalent oxygen or sulfur atom, an amino group, an amido group, a sulfonamido group, a ureido group, or a thioureido group; (b) a hydroxy group; and (c) a —C-(O)M or —S(O_2)M group;

R is a hydrocarbon linked directly or through a divalent oxy, thio, or carbonyl linkage, an imino group, an amino group, an amido group, a ureido group, a formamidine disulfide group, or a —C(O)M group; and

M is independently chosen to complete an acid, ester, thioester, or salt;

all aromatic hydrocarbon moieties being independently chosen from the group consisting of phenyl and naphthyl and all aliphatic hydrocarbon moieties containing up to 18 carbon atoms.

4,874,867

TETRAZOLE INTERMEDIATES TO ANTIHYPERTENSIVE COMPOUNDS

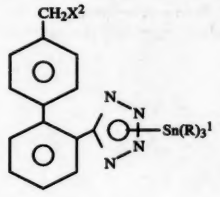
Paul E. Aldrich, Wilmington; John Jonas V. Duncia, Newark, and Michael E. Pierce, Wilmington, all of Del., assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Division of Ser. No. 53,198, May 22, 1987, Pat. No. 4,820,843. This application Nov. 23, 1988, Ser. No. 275,583

Int. Cl.[4] C07D *257/04*; C07F *7/22*

U.S. Cl. 548—101 **10 Claims**

1. A tetrazole having the formula:

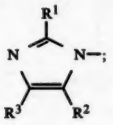


(I)

wherein

R is alkyl of 1–6 carbon atoms, phenyl or cyclohexyl;

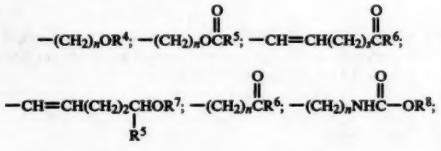
X^2 is H, Cl, Br, I, O-tosyl, OH, O-mesyl, or



R^1 is alkyl of 3–10 carbon atoms, alkenyl of 3 to 10 carbon atoms, alkenyl of 3 to 10 carbon atoms, alkynyl of 3 to 10 carbon atoms, and benzyl substituted with up to two groups selected from alkoxy of 1 to 4 carbon atoms, halogen, alkyl of 1 to 4 carbon atoms, nitro and amino;

R^2 is phenylalkenyl wherein the aliphatic portion is 2 to 4 carbon atoms, -$(CH_2)_m$-imidazoyl-1-yl,-$(CH_2)_{m-1,2,3}$-triazolyl optionally substituted with one or two groups selected from CO_2CH_3 and alkyl of 1 to 4 carbon atoms,

$(CH_2)_m$—tetrazolyl,



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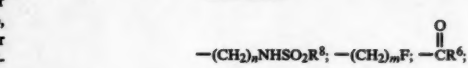


R^3 is H, F, Cl, Br, I, NO_2, CF_3, or CN;

R^4 is H, alkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, phenyl or benzyl;

R^5 is H, alkyl or perfluoroalkyl of 1 to 8 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, phenyl or benzyl;

R^6 is H, alkyl of 1–5 carbon atoms, OR^9 or $NR^{10}R^{11}$;

R^7 is H, alkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, phenyl, benzyl, acyl of 1 to 4 carbon atoms, phenacyl;

R^8 is alkyl of 1 to 6 carbon atoms or perfluoroalkyl of 1 to 6 carbon atoms, 1-adamantyl, 1-naphthyl, 1-(1-naphthyl)ethyl, or $(CH_2)_pC_6H_5$;

R^9 is H, alkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms; or phenyl;

R^{10} and R^{11} independently are H, alkyl of 1 to 4 carbon atoms, phenyl, benzyl or taken together to form a ring of the Formula

Q is NR^{12}, O or CH_2;

R^{12} is H, alkyl of 1 to 4 carbon atoms, or phenyl;

m is 1 to 5;

n is 1 to 10;

s is 0 to 5;

p is 0 to 3;

t is 0 or 1.

4,874,868

VOLATILE SILICONS

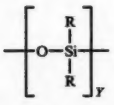
Raymond E. Bolich, Jr., Maineville, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 16, 1988, Ser. No. 168,720

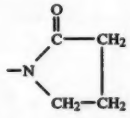
Int. Cl.[4] C07F *7/10, 7/08*

U.S. Cl. 548—110 **2 Claims**

1. A volatile silicon compound having the structure:



where (1) Y=3 to 6, (2) total carbons≦14, (3) R can be independently C_1–C_{10} alkyl and (4) at least one R per molecule must be selected from - R_1 R_2 where R_1=C_1–C_4 alkylene and R_2 is selected from the group consisting of (i) —O—R_3 where R_3=C_1–C_5 alkyl, (ii) - C_1–C_7 ketone,

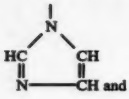


(iii)

(iv)

-continued

(v)



(vi)

4,874,869

HYDANTOIN DERIVATIVES AND MEDICINES CONTAINING THE SAME

Kouichiro Ueda, Saitama; Satoru Tanaka, Tokyo; Toshinobu Kunii; Kengo Kagei, both of Gifu; Tadashi Sato; Hideki Ono, both of Aichi; Issei Ohtsuka; Mayumi Kawase, both of Gifu; Toshiharu Ohgoh, Aichi, and Tsuneo Wakabayashi, Gifu, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 815,309, Dec. 31, 1985, abandoned, which is a continuation of Ser. No. 688,146, Dec. 31, 1984, abandoned, which is a division of Ser. No. 500,801, Jun. 7, 1983, Pat. No. 4,540,704, which is a continuation of Ser. No. 284,566, Jul. 17, 1981, abandoned. This application Jul. 13, 1987, Ser. No. 73,915

Claims priority, application Japan, Jul. 21, 1980, 60-98695

The portion of the term of this patent subsequent to Sep. 10, 2002, has been disclaimed.

Int. Cl.[4] C07D *491/10*

U.S. Cl. 548—309 **1 Claim**

1. the hydantoin derivative 6-fluoro-2,2-dimethyl-spiro-[chroman-4,4'-imidazolidine]-2',5'-dione and pharmaceutically acceptable salts thereof.

4,874,870

INTERMEDIATES FOR PREPARING HMG-COA REDUCTASE INHIBITORS

Samuel L. Graham, Harleysville, and Thomas H. Scholz, Souderton, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

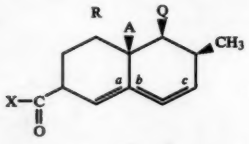
Division of Ser. No. 65,223, Jun. 22, 1987, Pat. No. 4,795,811. This application Aug. 12, 1988, Ser. No. 231,321

Int. Cl.[4] C07D *405/10*

U.S. Cl. 548—336 **5 Claims**

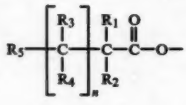
1. A compound represented by the structural formula (II),

II



wherein X is selected from: imidazole-1-yl or benzimidazol-1-yl

wherein R is



wherein:

n is 0 to 5

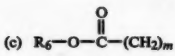
R_1 and R_2 independently are hydrogen, C_{1-5} alkyl, or R_1 and R_2 together with the carbon atom to which they are attached form a carbocyclic ring of 3 to 8 carbon atoms;

R_3 and R_4 are independently hydrogen, C_{1-3} alkyl, C_{3-7} cycloalkyl, C_{1-3} alkylthio, phenyl, phenylthio or substituted phenyl in which the substituents are V and W and when n is 2 to 5, each of the R_3s and R_4s are independently hydrogen, C_{1-3} alkyl, C_{3-7} cycloalkyl or only one of the R_3s and R_4s is phenyl or substituted phenyl;

R_5 is hydrogen, halogen, hydroxy, C_{1-5} alkyl, phenyl or substituted phenyl in which the substituents are V and W, or R_5 is a group selected from:

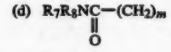
(a) C_{1-5} alkylthio or phenylthio or substituted phenylthio in which the substituents are V and W;

(b) C_{1-5}-alkanoyloxy-C_{1-4}-alkyl;



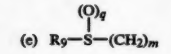
(c) R_6—O—C(=O)—$(CH_2)_m$

in which m is 0 to 3 and R_6 is C_{1-5} alkyl;



(d) $R_7R_8NC(=O)(CH_2)_m$

in which R_7 and R_8 are independently C_{1-5}alkyl or R_7 and R_8 together with the nitrogen atom to which they are attached form a heterocycle selected from piperidinyl, morpholinyl, pyrrolidinyl, piperazinyl or thiomorpholinyl;



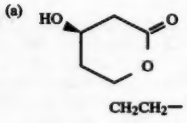
(e) R_9—S(O)$_q$—$(CH_2)_m$

in which q is 0 to 2 and R_9 is C_{1-5} alkyl or phenyl or substituted phenyl in which the substituents are V and W;

V and W independently are hydrogen, halogen, hydroxy, trifluoromethyl, C_{1-3} alkyl, C_{1-3}alkyloxy and hydroxy-C_{1-3} alkyl; and

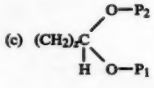
Q is selected from:

(a)



(b) $-CH_2CH_2CN$;

(c)



z is 0 to 2 and P_2 and P_1 are lower alkyl or P_2 and P_1 together with the oxygens and carbon to which they are attached form a ring of 5 to 8 atoms;

A is H or OH; and a, b and c represent single bonds or one of a, b or c represents a double bond or a and c are both double bonds.

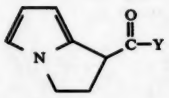
4,874,871

PROCESS FOR PREPARING (+)-2,3-DIHYDRO-1H-PYRROLO[1,2-A]PYRROLE-1-CARBOXYLIC ACID AND RELATED COMPOUNDS

Michael P. Fleming, Longmont; George C. Schloemer, Lyons, and Hiralal N. Khatri, Louisville, all of Colo., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

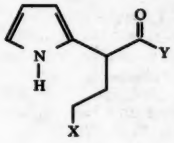
Filed Mar. 25, 1987, Ser. No. 30,774
Int. Cl.[4] C07D *487/04, 207/337, 207/333*
U.S. Cl. 548—543 **20 Claims**

1. A process for producing a compound of formula IX.



(IX)

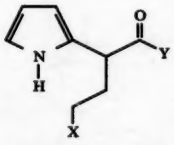
in which Y is
OH;
O⁻M⁺, wherein M is an alkali metal; or
NRR′, wherein R is lower alkyl and R′ is lower alkyl or aryl, or NRR′ is the residue of a saturated cyclic amine,
which comprises the reaction of a compound of formula XII,



(XII)

in which
Y is as previously defined; and
X is halogen,
with a strong base in an aprotic polar solvent.

9. A process for producing a compound of formula XII.

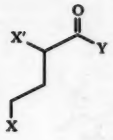


(XII)

in which
Y is OH,
O⁻M⁺, wherein M is an alkali metal, or
NRR′, wherein R is lower alkyl and R′ is lower alkyl or aryl, or NRR′ is the residue of a saturated cyclic amine; and
X is halogen,
which comprises the reaction of a compound of formula X,

(X)

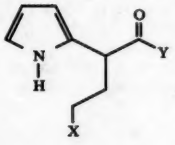
in which Z is Li, MgCl, or MgBr,
with a compound of formula XI,



(XI)

in which
X and X′ are independently halogen.

17. A compound of formula XII,



(XII)

in which
X is halogen; and
Y is OH;
O⁻M⁺, wherein M is an alkali metal; or
NRR′, wherein R is lower alkyl and R′ is lower alkyl or aryl, or NRR′ is the residue of a saturated cyclic amine.

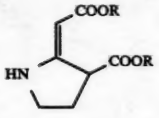
4,874,872

PROCESS FOR PREPARING (+)-2,3-DIHYDRO-1H-PYRROLO[1,2-A]PYRROLE-1,7-DICARBOXYLATES

Michael P. Fleming, Longmont; Hiralal N. Khatri, Louisville, and George C. Schloemer, Lyons, all of Colo., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 3,104, Jan. 14, 1987, Pat. No. 4,849,526.
This application Oct. 11, 1988, Ser. No. 255,799
Int. Cl.[4] C07D *207/16*
U.S. Cl. 548—531 **3 Claims**

1. A compound of formula XVI,



(XVI)

in which
each R is independently lower alkyl.

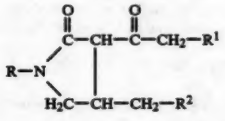
4,874,873

PROCESS FOR THE PREPARATION OF 3-ACYLPYRROLIDONES

Frank X. Woolard, Richmond, Calif., assignor to ICI Americas Inc., Wilmington, Del.

Filed Dec. 27, 1988, Ser. No. 290,219
Int. Cl.[4] C07D *207/46*; A01N *43/36, 43/40*
U.S. Cl. 548—540 **12 Claims**

1. A process for the manufacture of a compound having the formula



(I)

wherein

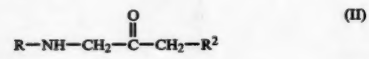
R is lower alkyl, lower haloalkyl, lower cycloalkyl, lower cycloalkylalkyl, benzyl, chlorobenzyl or the group

in which each of X and Y is independently hydrogen, halogen, lower alkyl, lower haloalkyl, lower alkoxy, lower haloalkoxy, lower alkylsulfinyl, lower haloalkylsulfinyl, lower alkylsulfonyl, lower haloalkylsulfonyl, phenoxy, substituted phenoxy, pyridyloxy, or substituted pyridyloxy;

R^1 is hydrogen or halogen; and

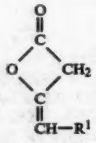
R^2 is hydrogen or lower alkyl; which process comprises

(a) reacting a compound having the formula



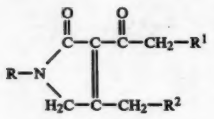
(II)

wherein R and R^2 are as defined above, with a diketene of the formula



(III)

wherein R^1 is as defined above, in the presence of a catalytic amount of a tertiary amine, to give a pyrrolidin-2-one of the formula



(IV)

and,

(b) reducing the compound of formula IV with hydrogen gas in the presence of a noble metal catalyst to give a compound of formula I.

4,874,874

PREPARATION OF 3-SULPHENYLMALEIMIDES

Engelbert Kühle, Bergisch Gladbach, and Alfons Adler, Cologne, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

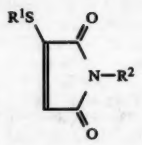
Filed Oct. 26, 1987, Ser. No. 113,688

Claims priority, application Fed. Rep. of Germany, Nov. 4, 1986, 3637507

Int. Cl.[4] C07D *207/456*

U.S. Cl. 548—544 **4 Claims**

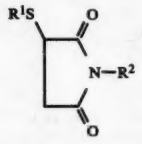
1. A process for the preparation of a 3-sulphenylmaleimide of the formula



in which

R^1 is alkyl, or optionally substituted cycloalkyl or aralkyl, and

R^2 is optionally substituted alkyl, cycloalkyl, aryl or aralkyl, comprising reacting a 3-sulphenylsuccinimide of the formula



with an equimolar amount of hydrogen peroxide in the presence of a lower alkanecarboxylic acid as a solvent.

4,874,875

PERFLUORO-AMINO-OXAZIRIDINES

Walter Navarrini, Milan, Italy, and Darryl D. Desmarteu, Clemson, S.C., assignors to Ausimont S.r.l., Milan, Italy

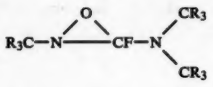
Filed Nov. 7, 1988, Ser. No. 268,248

Claims priority, application Italy, Nov. 10, 1987, 22576 A/87

Int. Cl.[4] C07D *301/03*

U.S. Cl. 548—959 **2 Claims**

1. Perfluoro-oxaziridines characterized by the presence of an aminic group in position 3 of the oxaziridine ring, of the formula:



where each R is independently either F or a perfluoroalkyl group having from 1 to 10 carbon atoms.

4,874,876

PROCESS FOR THE PREPARATION OF 2-(2-THIENYL)-ETHYLAMINE AND DERIVATIVES THEREOF

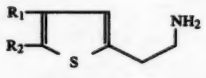
Neil J. O'Reilly, and Henry C. Lin, both of Grand Island, N.Y., assignors to Occidental Chemical Corporation, Niagara Falls, N.Y.

Filed Nov. 2, 1988, Ser. No. 265,980

Int. Cl.[4] C07D *333/58*

U.S. Cl. 549—49 **9 Claims**

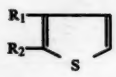
1. A process for the preparation of 2-(2-thienyl)-ethylamine derivatives having the formula:



(I)

wherein R_1 and R_2 are hydrogen or taken together form a phenyl ring comprising:

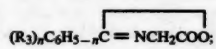
(a) reacting a derivative having the formula:



(II)

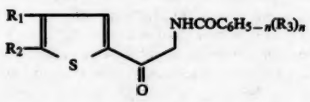
with a mixture of an acylating compound selected from the group consisting of:

$(R_3)_nC_6H_{5-n}CONHCH_2COCl$, and (i)



(ii)

wherein R_3 is selected from the group consisting of C_{1-4} lower alkyl, C_{1-4} lower alkoxy, phenoxy, NO_2, CF_3, Cl, Br, I and F, and n=0 to 3, and an acylating catalyst to give a derivative having the formula:



(III)

(b) reducing and hydrolyzing the derivative of formula (III) to give the derivative of formula (I).

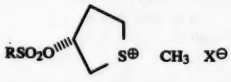
4,874,877

PROCESS FOR OPTICALLY ACTIVE 3-(METHANE-SULFONYLOXY)THIOLANE AND ANALOGS

Frank J. Urban, Waterford, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Apr. 19, 1988, Ser. No. 183,102
Int. Cl.[4] C07D *333/32*
U.S. Cl. 549—66 **3 Claims**

1. A compound having the formula



(IV)

wherein R is (C_1–C_3)alkyl, phenyl or tolyl and X is RSO_3 or halogen.

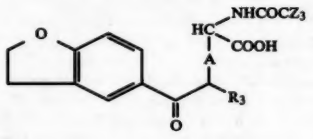
4,874,878

CERTAIN DIHYDROBENZOFURAN BUTANOIC AND PENTANOIC ACID DERIVATIVES

Jean L. Peglion, Le Vesinet; Jean C. Poignant, Bures sur Yvette, and Joel Vian, Chaville, all of France, assignors to Adir Et Cie, Neuilly-sur-Seine, France

Division of Ser. No. 173,286, Mar. 25, 1988, Pat. No. 4,851,429. This application Jan. 24, 1989, Ser. No. 301,160
Claims priority, application France, Apr. 1, 1987, 87 04550
Int. Cl.[4] C07D *307/78*
U.S. Cl. 549—462 **4 Claims**

1. A compound of formula IV



IV

in which

R_3 denotes a hydrogen atom or a linear or branched alkyl radical containing 1 to 4 carbon atoms, inclusive

A denotes a single bond or a methylene radical, or a radical of formula

in which

R_4 denotes a linear or branched alkyl radical containing 1 to 4 carbon atoms, inclusive and

Z denotes a hydrogen atom or a fluorine atom.

4,874,879

PROCESS FOR STARTING-UP AN ETHYLENE OXIDE REACTOR

Ann M. Lauritzen, Houston; David S. Baker, Sugarland; Margot H. Christiansen, Houston; Beamon M. Johnson, Brookshire, and John G. Schuren, Houston, all of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Jul. 25, 1988, Ser. No. 224,049
Int. Cl.[4] C07D *301/10*
U.S. Cl. 549—536 **17 Claims**

1. A process for starting up a fixed bed ethylene oxide reactor containing a catalyst comprising silver, alkali metal promoter and rhenium co-promoter supported on an alumina carrier, which process comprises:

(a) heating the reactor to a temperature between about 400° F. and 475° F.,

(b) passing an ethylene-containing gas over the catalyst in the reactor at a flow rate between about 5 to about 40 percent of the design flow rate,

(c) adding a chlorohydrocarbon moderator to the gas passing over the catalyst and after between about 0.1 to about 10 cubic centimeters of moderator (basis liquid) per cubic foot of catalyst has been added,

(d) adding oxygen to the gas passing over catalyst, and raising the reactor temperature and gas flow rates to operating conditions.

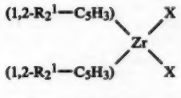
4,874,880

BIS(DI-, TRI- OR TETRA-SUBSTITUTED-CYCLOPENTADIENYL)-ZIRCONIUM DIHALIDES

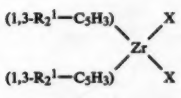
Shinya Miya, Ichiharashi; Masato Harada, Kisarazushi; Takaya Mise, Kawagoeshi, and Hiroshi Yamazaki, Tokorozawashi, all of Japan, assignors to Chisso Corporation and The Institute of Physical & Chemical Research, both of, Japan

Filed Feb. 22, 1988, Ser. No. 158,924
Claims priority, application Japan, Mar. 10, 1987, 62-54367; Mar. 10, 1987, 62-54368; Mar. 10, 1987, 62-54369; Mar. 23, 1987, 62-68630; Mar. 25, 1987, 62-71157
Int. Cl.[4] C07F *7/00*
U.S. Cl. 556—53 **3 Claims**

1. Bis(di-substituted-cyclopentadienyl)zirconium dihalides represented by the following general formula or,



[I]



[II]

wherein R^1 denotes a substituent group on the cyclopentadienyl ring which is an alkyl radical of 1 to 5 carbon atoms;

R_2^1—C_5H_3 stands for a di-substituted cyclopentadienyl radical; and X is a halogen atom.

4,874,881

METHOD FOR PRODUCING A POLYDIORGANOSILOXANE HAVING A PENDENT ALKENYL RADICAL AT ITS MOLECULAR CENTER

Toshio Suzuki, and Tadashi Okawa, both of Chiba, Japan, assignors to Toray Silicone Company, Ltd., Tokyo, Japan

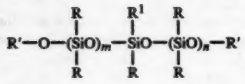
Filed Sep. 8, 1988, Ser. No. 242,016

Claims priority, application Japan, Sep. 8, 1987, 62-224939

Int. Cl.[4] C07F 7/08

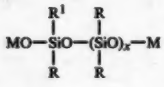
U.S. Cl. 556—453 11 Claims

1. A method for the preparation of a polydiorganosiloxane having a pendant alkenyl radical in the middle of the molecular chain with the following formula



comprising polymerizing cyclic trisiloxane of the formula

using an organopolysiloxane alkali metal salt of the formula



as the polymerization initiator under nonequilibrium conditions where the ingredients are substantially anhydrous, terminating the polymerization when the target polydiorganopolysiloxane is obtained, in the above formulas, R^1 is an alkenyl radical; each R is a monovalent hydrocarbon group or monovalent halogenated hydrocarbon group, and these groups may be the same or different; M is an alkali metal; x is an integer having a value from one to ten; R' is the hydrogen atom or a monovalent endcapping group; m is at least x+3; and n is at least x+3.

4,874,882

PROCESS FOR PREPARING MONOSODIUM PHOSPHOENOLPYRUVATE

Naotaka Hamasaki, Fukuoka; Hirotaka Kawamura, Ube; Norio Ohtsu, Ube; Ichiro Nakakoshi, Ube; Kikuo Ataka, Ube; Kiyosi Oomori, Ube, and Masahiko Kouno, Ube, all of Japan, assignors to Ube Industries, Ltd., Ube, Japan

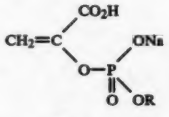
Filed Mar. 18, 1987, Ser. No. 27,631

Claims priority, application Japan, Mar. 25, 1986, 61-64744; May 19, 1986, 61-112482

Int. Cl.[4] C07F 9/09

U.S. Cl. 558—131 10 Claims

1. A process for preparing monosodium phosphoenolpyruvate, which comprises hydrolyzing monosodium monosubstituted phosphoenolpyruvate of Formula (I):



(I)

wherein, R represents C_1–C_6 alkyl group, a C_3–C_{10} cycloalkyl group or a C_7–C_{10} aralkyl group, with water to form said monosodium phosphoenolpyruvate.

4,874,883

PROCESS FOR THE PRODUCTION AND ISOLATION OF MONOALKYL PHOSPHORIC ACID ESTERS

Guenter Uphues, Monheim; Uwe Ploog, Haan, and Klaudia Bischof, Werne, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jan. 29, 1988, Ser. No. 150,691

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1987, 3702766

Int. Cl.[4] C07F 9/09

U.S. Cl. 558—150 10 Claims

1. A process for the production and isolation of monoalkylphosphoric acid esters, comprising the steps of

(a) reacting at least one fatty alcohol containing from 8 to 18 carbon atoms with from an about 0.2 to an about 2 molar excess of polyphosphoric acid in an inert solvent having a boiling point in the range of from about 60 to about 140° C. selected from the group consisting of alkanes, aromatics, and cycloalkanes at a temperature of from about 60° to about 130° C.;

(b) maintaining the resulting reaction mixture at a temperature of from about 90° to about 130° C. for a period of time of from about 120 to about 300 minutes;

(c) hydrolyzing the reaction mixture with from about 0.5 to about 1.0 mole of water, based on the quantity of phosphorus atoms in the reaction mixture, at a temperature of from about 90° to about 100° C. to form a hydrolysis product;

(d) neutralizing from about 40 to about 65%, based on acid number, of the hydrolysis product with an alkali metal hydroxide;

(e) maintaining the resulting mixture containing the partially neutralized hydrolysis product for a period of from about 30 to about 180 minutes at a temperature of from about 50° to about 95° C. to form two phases; and

(f) separating the resulting phases.

4,874,884

PROMOTER SYNERGISM IN PENTENENITRILE HYDROCYANATION

Ronald J. McKinney, Wilmington, Del., and Robert B. Osborne, Orange, Tex., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 176,241, Mar. 31, 1988. This application Feb. 14, 1989, Ser. No. 310,411

Int. Cl.[4] C07C 120/02

U.S. Cl. 558—338 6 Claims

1. In a process for producing adiponitrile by the addition of hydrogen cyanide to pentenenitriles in the presence of a zerovalent nickel catalyst and catalyst promoter, the improvement comprising conducting the process in the presence of a combination of two Lewis acid promoters, LA_A and LA_B, wherein the rate constant for the rate of isomerization of 3-pentenenitrile to 4-pentenenitrile, k_1, in the presence of the first Lewis acid promoter, LA_A is greater than k_1 in the presence of the second Lewis acid promoter, LA_B, and wherein the rate constant for the rate of hydrocyanation of 4-pentenenitrile to adiponitrile, k_2, in the presence of LA_B is greater than k_2 in the presence of LA_A.

4,874,885
PROCESS FOR THE PREPARATION OF MERCAPTOMETHYLPHENOLS

Werner Stegmann, Liestal; Hans R. Meier; Samuel Evans, both of Marly; Roger Martin, Tentlingen, and Reto Luisoli, Höstein, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

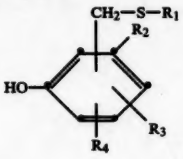
Filed Dec. 15, 1987, Ser. No. 133,414

Claims priority, application Switzerland, Dec. 24, 1986, 5237/86

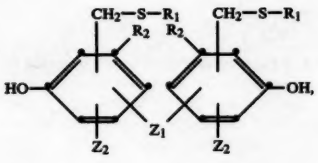
Int. Cl.[4] C07C *149/36, 149/70, 149/41*

U.S. Cl. 560—15 **10 Claims**

1. A process for the preparation of a compound of formula I or II



(I)



(II)

wherein

R_1 is C_1–C_{20}alkyl which is unsubstituted or substituted by 1 or 2 hydroxyl groups or interrupted by —O—, or is C_1–C_4alkylene-$COOR_5$, C_1–C_4alkylene-C-NR_5R_6, C_5–C_{12}cycloalkyl, phenyl, 1-naphthyl, 2-naphthyl, C_1–C_4alkylphenyl or phenyl-C_1–C_4alkyl,

R_2 is hydrogen, C_1–C_{20}alkyl, C_2–C_{18}alkenyl or halogen,

R_3 and R_4 are each independently of the other C_1–C_{20}alkyl, allyl, C_5–C_{12}cycloalkyl, phenyl, phenyl-C_1–C_4alkyl, halogen or —CH_2—S—R_1, with the proviso that at least one of R_3 and R_4 is —CH_2—S—R_1,

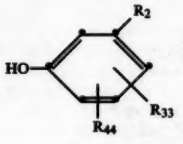
R_5 is C_1–C_{20}alkyl, allyl, C_5–C_{12}cycloalkyl, phenyl or benzyl,

R_6 is hydrogen, C_1–C_{20}alkyl or C_2–C_{18}alkenyl,

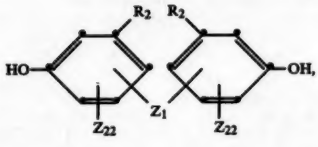
Z_1 is —S— or —$C(Z_3)(Z_4)$—,

Z_2 is hydrogen, C_1–C_{20}alkyl or -CH_2-S-R_1,

Z_3 is hydrogen or methyl and Z_4 is hydrogen or C_1–C_8alkyl, with the proviso that the phenols of formla I or II in m-position do not contain the functional group —CH_2—S—R_1, by reaction of a phenol of formula III or IV



(III)



(IV)

wherein

R_2 and Z_1 are as previously defined,

R_{33} and R_{44} are each independently of the other hydrogen, C_1–C_{20}-alkyl, allyl, C_5–C_{12}cycloalkyl, phenyl, phenyl-C_1–C_4alkyl or halogen, with the proviso that at least one of R_{33} and R_{44} is hydrogen, and

Z_{22} is hydrogen or C_1–C_{20}alkyl, with formaldehyde or a compound that liberates formaldehyde under the reaction conditions and with at least ne mercaptan R_1—SH, in the presence of a base, said base being mono- or dimethylamine or mono- or diethylamine.

4,874,886
NOVEL FLUORINATED BIS(SALICYLATES)

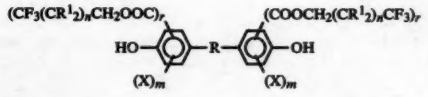
Charles B. Grant, Pittsburg, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 7, 1988, Ser. No. 268,118

Int. Cl.[4] C07C *69/88*

U.S. Cl. 560—70 **12 Claims**

1. The fluorinated bis(salicylate) corresponding to the formula:



wherein

R is a C_{1-18} divalent hydrocarbon radical, a C_{1-18} divalent inertly substituted hydrocarbon radical, or a C_{1-18} divalent halocarbon radical;

R^1 is independently in each occurrence a hydrogen or fluorine;

X is independently in each occurrence hydrogen, a halogen, a C_{1-3} alkyl, a C_{1-3} haloalkyl, or a nitrile;

m is independently in each occurrence an integer between 0 and 3 inclusive;

n is independently in each occurrence an integer between 0 and 6 inclusive; and

r is independently in each occurrence an integer between 1 and 4 inclusive.

4,874,887
PROCESS FOR THE PREPARATION OF PYRETHROID TYPE ESTER COMPOUNDS

Sang H. Jung, and Seung K. Kim, both of Chungcheongnam, Rep. of Korea, assignors to Lucky, Ltd., Seoul, Rep. of Korea

PCT No. PCT/KR88/00003, § 371 Date Oct. 7, 1988, § 102(e) Date Oct. 7, 1988, PCT Pub. No. WO88/06151, PCT Pub. Date Aug. 25, 1988

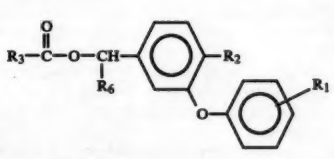
PCT Filed Feb. 2, 1988, Ser. No. 259,267

Claims priority, application Rep. of Korea, Feb. 13, 1987, 87 1205; Feb. 13, 1987, 87 1206

Int. Cl.[4] C07C *121/75*

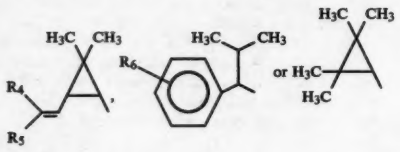
U.S. Cl. 560—124 **20 Claims**

1. A process for the preparation of a pyrethroid ester compound of the general formula (I):

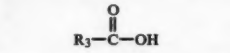


(I)

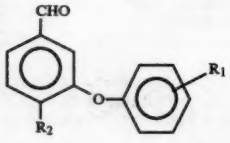
wherein R_1 and R_2 are the same or different from each other and represent a hydrogen or a halogen atom; R_3 represents



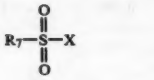
(wherein R_4 and R_5 represent a chlorine or bromine atom or a methyl group when R_4 is identical to R_5, but R_4 represents a chlorine or bromine atom or a methyl group and R_3 represents a trifluoromethyl group when R_4 is different from R_5, and R_6 represents a halogen atom or difluoromethoxy group); and R_6 represents a cyano group, which comprises reacting an organic acid of the general formula (II), an aldehyde of the general formula(III) and a water-soluble cyanide with a sulphonyl compound of the general formula(IV) wherein R_7 represents an aryl, alkyl or an optionally-substituted aryl and X is a halogen, azide, cyanide, imidazole, triazole, nitrotriazole or tetrazole, in the presence of a two-phase solvent system consisting of water and a substantially water-immiscible aprotic solvent and a phase transfer catalyst and then reacting the reaction mixture with a water-soluble inorganic base:



(II)



(III)



(IV)

4,874,888

PROCESS FOR THE PREPARATION OF A DIESTER OF OXALIC ACID

Yasushi Shiomi; Tokuo Matsuzaki, and Katsuro Masunaga, all of Ube, Japan, assignors to UBE Industries, Ltd., Yamaguchi, Japan

Filed Oct. 28, 1983, Ser. No. 546,532
Claims priority, application Japan, Nov. 1, 1982, 190,855
Int. Cl.[4] C07C *67/36*
U.S. Cl. 560—204 15 Claims

1. In a process for preparing a diester of oxalic acid by the vapor phase catalytic reaction of carbon monoxide with an ester of nitrous acid in the presence of a catalyst composed of a solid carrier and a catalyst component supported on the carrier, the improvement wherein said catalyst component is composed of

(a) a platinum-group metal or a salt thereof in an amount of from about 0.01 to about 10% by weight,

calculated as the platinum-group metal, based on the weight of the carrier, and

(b) at least one number selected from the group consisting of iron and an iron (II or III) compound, the atomic ratio of the component (a) to the component

(b) as metal being from 10,000:1 to 1:4.

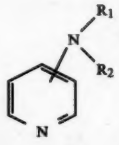
4,874,889

ISOMERIZATION OF 2-PENTENOATES TO 3-PENTENOATES

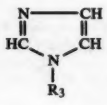
Rolf Fischer, Heidelberg; Franz Merger, Frankenthal, and Hans-Juergen Gosch, Bad Duerkheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Nov. 18, 1987, Ser. No. 122,941
Claims priority, application Fed. Rep. of Germany, Nov. 27, 1986, 3640597
Int. Cl.[4] C07C *67/333*
U.S. Cl. 560—205 5 Claims

1. A process for the preparation of a 3-pentenoate by isomerization of a 2-pentenoate to a 3-pentenoate, wherein the 2-pentenoate is treated with a tertiary amine having a pK_a value >6 selected from the group consisting of an aminopyridine of the formula:



where R_1 and R_2 are identical or different and are each alkyl of 1 to 4 carbon atoms, or R_1 and R_2, together with the nitrogen on which they are substituents, may form a 5- of 7-membered ring which may additionally contain an oxygen or nitrogen atom, and an imidazole of the formula:



where R_3 is alkyl of 1 to 4 carbon atoms.

4,874,890

PROCESS FOR THE PRODUCTION OF DEUTERATED METHYL ACRYLATE OR DEUTERATED METHYL METHACRYLATE

Masaaki Kato; Tetsuya Uno; Masao Kobayashi, and Naoto Osuga, all of Otake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 807,710, Dec. 11, 1985, abandoned. This application Feb. 8, 1988, Ser. No. 154,485
Claims priority, application Japan, Dec. 21, 1984, 59-270319
Int. Cl.[4] C07C *69/52*
U.S. Cl. 560—205 10 Claims

1. A process for the production of deuterated methyl acrylate or deuterated methyl methacrylate, comprising the direct substitution of deuterium, from a source chosen from at least one of heavy water and deuterium gas, for the hydrogens in methyl acrylate or methyl methacrylate in the presence of at least one platinum group metal catalyst selected from the group consisting of platinum and palladium catalysts at a temperature in the range of from room temperature up to 300° C.

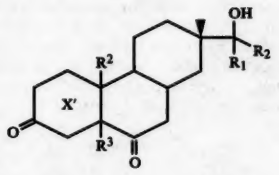
4,874,891

OPEN "D" RING HORMONE ANALOGS

Douglas F. Covey, and Ricahrd J. Auchus, both of St. Louis, Mo., assignors to Washington University, St. Louis, Mo.

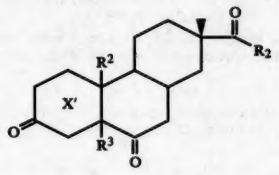
Filed May 1, 1986, Ser. No. 858,393
Int. Cl.[4] C07C *67/02*
U.S. Cl. 560—256 11 Claims

1. A compound of the formula



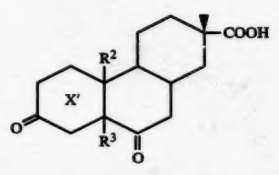
1A'

or



1B'

or



1C'

wherein x represents the presence or absence of 0, 1, or 2 conjugated or unconjugated π bond(s);

and wherein:

R^2 is H, alkyl(1–6), 2-propynyl, or allenyl;

R^3 is H or OR^5, wherein R^5 is H, acyl of (1-7 carbon atoms), or alkyl(1–6); and

wherein R_1 and R_2 is each independently H, alkyl(1–6) or is $-C{\equiv}CR_3$, $-CH{=}CHR_3$, or $-CH{=}C{=}CHR_3$, wherein R_3 is selected from the group consisting of H, halo, CF_3, alkyl of (1–6) carbon atoms, acyloxy, carboxy carboalkoxylate, alkoxy, or alkylthio.

4,874,892

PROCESS FOR THE PREPARATION OF 6-HYDROXYNAPHTHALENE-1-CARBOXYLIC FROM 1-AMINOMETHYLNAPHTHALENE-6-SULPHONIC ACID

Erich Hammerschmidt, and Heinz U. Blank, both of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Division of Ser. No. 108,525, Oct. 15, 1987, Pat. No. 4,795,596. This application Jul. 18, 1988, Ser. No. 220,294

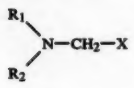
Claims priority, application Fed. Rep. of Germany, Oct. 31, 1986, 3637138

Int. Cl.[4] C07C *51/265*

U.S. Cl. 562—409 **6 Claims**

1. A process for the preparation of 6-hydroxynaphthalene-1-carboxylic acid comprising the following steps:

(a) amidoalkylating naphthalene-2-sulphonic acid in an acid medium with an amidoalkylating agent of the formula



(II)

in which

R_1 is acyl,

R_2 is hydrogen or acyl, or

R_1 and R_2 together form a diacyl radical,

X is halogen, and R_3O-group or an $(R_1)(R_2)N$-group and

R_3 is hydrogen, acyl or an $(R_1)(R_2)N—CH_2—$ group;

(b) splitting off the acyl radical R_1 or the acyl radicals R_1 and R_2 from the amidoalkylation product by acid or alkaline hydrolysis;

(c) oxidizing the 1-aminomethyl-naphthalene-6-sulfonic acid obtained in step (b) to form a 1-carboxynaphthalene-6-sulphonic acid; and

(d) converting the 1-carboxynaphthalene-6-sulphonic acid by alkali fusion into the 6-hydroxynaphthalene-1-carboxylic acid.

4,874,893

INDUSTRIAL PROCESS FOR THE PREPARATION OF AMINO ACIDS BY HYDROLYSIS OF PROTEINS IN ACID MEDIUM

Michel Flork, Chamalieres, France, assignor to Laboratoires Flork S.A. Zone Industrielle Du Brezet, Clermont-Ferrand, France

PCT No. PCT/FR87/00094, § 371 Date Jan. 27, 1988, § 102(e) Date Jan. 27, 1988, PCT Pub. No. WO87/05895, PCT Pub. Date Oct. 8, 1987

PCT Filed Mar. 26, 1987, Ser. No. 133,045

Claims priority, application France, Mar. 27, 1986, 86 04441

Int. Cl.[4] C07C *99/02*

U.S. Cl. 562—443 **6 Claims**

1. In a process for the industrial preparation of amino acids by hydrolysis of protein of animal or vegetable origin in a sulfuric acid medium within a reaction tank, comprising:

conducting protein hydrolysis with sulfuric acid having a concentration of at least 12N and at a temperature of at least 100° C., stopping the hydrolysis by addition of water so as to lower the temperature and to reduce the sulfuric acid concentration to a value of 6N or less and removing the excess of sulfuric acid by neutralization, the improvement wherein the reaction tank is charged with water and an initial portion of a sulfuric acid solution in an amount necessary for said hydrolysis of said protein, said tank is heated at a temperature between 100° C. and the boiling point thereof prior to the addition of said protein to said tank, said water diluting the sulfuric acid solution initially added, so that the concentration of sulfuric acid within said reaction tank is about 12–14N, the protein to be hydrolyzed is then added simultaneously with but separately from a remaining portion of said sulfuric acid solution in an amount necessary for said hydrolysis in an amount corresponding to that required for the neutralization of amine groups of amino acids generated by the hydrolysis of the protein, so that said protein and said remaining portion of said sulfuric acid solution are added at independently adjustable rates while maintaining the concentration of acid with said reaction tank at about 12–14N.

4,874,894

PROCESS FOR THE PRODUCTION OF BENZENESULFONAMIDES

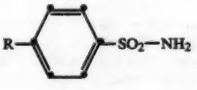
Ramamurthi Kannan, Edgewood, Ky., assignor to Hilton Davis Co., Cincinnati, Ohio

Filed Apr. 29, 1987, Ser. No. 43,788

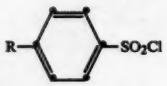
Int. Cl.[4] C07C *143/882*

U.S. Cl. 564—93 **7 Claims**

1. A process for the production of a 4-R-benzenesulfonamide of the formula



wherein R represents a non-tertiary C_1 to C_{16} alkyl or a non-tertiary C_1 to C_{16} alkoxy, which consists of in the first step reacting a R-benzene with sulfuric acid and phosphorus oxychloride to produce a 4-R-benzenesulfonyl chloride of the formula



and in a second step amidating said 4-R-benzenesulfonyl chloride with ammonia in an aqueous medium to obtain said 4-R-benzenesulfonamide.

4,874,895

PROCESS FOR PURIFYING CRUDE TRIFLURALIN

Donadello Graziello, Valdagno, Italy, assignor to Finchimica S.p.A., Manerbio, Italy

Continuation of Ser. No. 129,347, Nov. 27, 1987, abandoned, which is a continuation of Ser. No. 824,888, Jan. 31, 1986, abandoned. This application Feb. 17, 1989, Ser. No. 313,356

Claims priority, application Italy, Dec. 18, 1985, 23247 A/85

Int. Cl.[4] C07C *85/26, 111/00, 85/11, 87/60*

U.S. Cl. 564—437 8 Claims

1. An improved process for purifying crude trifluralin containing nitrosamines to reduce the level thereof to below at least 0.5 ppm, wherein crude trifluralin is treated by mixing under agitation with an aqueous solution of hydrobromic acid, wherein the improvements consists of adding to said aqueous solution an amount of sulfamic acid of from 0.1 to 3 g per liter of said aqueous hydrobromic acid solution and an amount of a bisulfite of an alkali metal corresponding to a content of sulphur dioxide of from 0.3 to 1.2 g/l of said aqueous solution.

4,874,896

PROCESS FOR THE PRODUCTION OF ALKYLAMINES

Kurt D. Olson, Cross Lanes, and Steven W. Kaiser, South Charleston, both of W. Va., assignors to UOP, Des Plaines, Ill.

Filed Dec. 23, 1987, Ser. No. 137,198

Int. Cl.[4] C07C *85/06;* B61J *27/182*

U.S. Cl. 564—479 62 Claims

1. A process for preparing an alkylamine which comprises contacting an alcohol with at least one compound having the formula:

$$N—(R')_3$$

wherein each R′ group is a member selected from hydrogen or an alkyl radical containing from 1 to 12 carbon atoms, each of said R′ groups being the same or different from other R′ groups in the said compound, with a non-zeolitic molecular sieve under conditions effective to produce the alkylamine.

4,874,897

BISPHOSPHINE PRODUCTION

Friedrich Bickelhaupt, and Thomas van der Does, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed May 4, 1988, Ser. No. 190,187

Claims priority, application Netherlands, May 5, 1987, 8701058

Int. Cl.[4] C07F *9/02*

U.S. Cl. 568—13 7 Claims

1. A process for the production of 1,3-bis[di(2-alkoxyphenyl)phosphino]propane which comprises (1) reacting 2-alkoxyphenyl halide with magnesium, thereby producing the corresponding 2-alkoxyphenyl-magnesium halide; (2) reacting said 2-alkoxyphenylmagnesium halide with phosphorus trihalide, thereby producing the corresponding di(2-alkoxyphenyl)-phosphorus halide; (3) producing from said di(2-alkoxyphenyl)phosphorus halide the corresponding di(2-alkoxyphenyl)phosphine by reaction with alkali metal-containing hydride followed by hydrolysis; and (4) reacting the di(2-alkoxyphenyl)phosphine with 1,3-dihalopropane in the presence of strong base, and recovering 1,3-bis[di(2-alkoxyphenyl)-phosphino]propane from the resulting mixture.

4,874,898

NOVEL SUBSTITUTED ANTHRASTEROID DERIVATIVES

Ken'ichi Takeda, Hyogo, and Isao Horibe, Osaka, both of Japan, assignors to Shionogi and Co., Ltd. Patent Department, Osaka, Japan

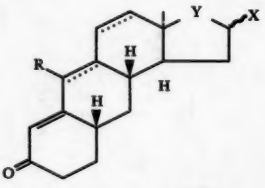
Filed Jul. 7, 1988, Ser. No. 216,525

Claims priority, application Japan, Jul. 31, 1987, 62-193608

Int. Cl.[4] C07C *49/617*

U.S. Cl. 568—369 7 Claims

1. A substituted anthrasteroid derivative represented by the following formula:



wherein R is hydrogen or lower alkyl; X is hydrogen, lower alkyl, halogen, hydroxy, hydroxymethyl, or halomethyl; Y is C=O, CH~OR′, or OH C . . . R″, wherein R′ is (1) hydrogen, (2) lower alkyl, (3) saturated or unsaturated cycloalkyl optionally substituted by ethyl, methoxy, or ethoxy, or (4) aliphatic lower acyl which may have carboxy or its lower alkyl ester at the terminal; R″ is lower alkyl or lower alkynyl; the dotted line indicates the presence or absence of a double bond; and the wavy line indicates an α or β configuration with the proviso that in the absence of a double bond between 5a and 6 positions, the configuration of the hydrogen atom at the 5a position is α; or an ethylene acetal derivative thereof.

4,874,899

PREPARATION OF UNSATURATED AND SATURATED KETONES

Wolfgang Hoelderich, Frankenthal; Leopold Hupfer, Friedelsheim, and Kurt Schneider, Bad Duerkheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

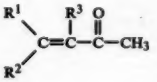
Filed Jun. 15, 1988, Ser. No. 206,731

Claims priority, application Fed. Rep. of Germany, Jun. 24, 1987, 3720850

Int. Cl.[4] C07C *45/55*

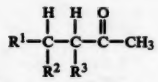
U.S. Cl. 568—386 5 Claims

1. A process for the preparation of an unsaturated ketone of the formula (I)



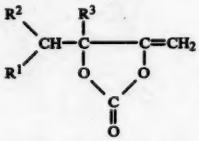
(I)

or a saturated ketone of the formula (II)



(II)

where R^1, R^2 and R^3 are each hydrogen, alkyl of 1 to 12 carbon atoms or a cycloalkyl, aryl, aralkyl or alkylaryl radical, or R^1 and R^3 or R^2 and R^3, together with the carbon atoms to which they are bonded, may form a cycloalkane, wherein a 5-methylene-1,3-dioxolanone which is substituted in the 4-position and is of the formula (III)



(III)

where R^1, R_2 and R^3 have the above meanings, (a) for the preparation of an unsaturated ketone (I), is converted in the gas phase at a temperature of from 100° to 500° C. in a fixed or fluidized catalyst bed, or in the liquid phase at a temperature of from 50° to 200° C. in the presence of a zeolite and/or of a B, Ce, Fe, Zr or Sr phosphate as catalysts and (b) for the preparation of a saturated ketone (II), is converted in the gas phase at a temperature of from 100° to 500° C. in a fixed or fluidized catalyst bed, or in the liquid phase at a temperature of from 50° to 200° C. in the presence of hydrogen over a zeolite and/or a B, Ce, Fe, Zr or Sr phosphate, which carries one or more hydrogenation components, as catalysts.

4,874,900

PREPARATION OF PSEUDOIONONES

Peter W. D. Mitchell, Freehold, N.J., assignor to Union Camp Corporation, Wayne, N.J.

Filed Jun. 16, 1987, Ser. No. 62,884
Int. Cl.[4] C07C *45/45*
U.S. Cl. 568—390 **15 Claims**

1. A method of preparing a pseudoionone which comprises: condensing citral with a ketone in the presence of a catalytic proportion of lithium hydroxide.

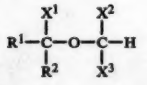
4,874,901

PROCESS FOR THE PRODUCTION OF POLYFLUORINATED ETHERS

Donald F. Halpern, Fanwood, and Mark L. Robin, South Plainfield, both of N.J., assignors to BOC, Inc., New Providence, N.J.

Filed May 6, 1988, Ser. No. 191,442
Int. Cl.[4] C07C *41/22*
U.S. Cl. 568—683 **12 Claims**

1. A method for the fluorination of a compound of the formula:



wherein X^1, X^2 and X^3 are hydrogen, chloro, or fluoro, with the proviso that at least one is chloro and R^1 and R^2 are either hydrogen or halo lower alkyl with the proviso that at least one is halo lower alkyl, said method comprising reacting sodium fluoride or potassium fluoride with said compound at an elevated temperature and pressure in the absence of added solvent.

4,874,902

METHOD FOR THE PREPARATION OF FLUOROMETHYL 1,1,1,3,3,3-HEXAFLUORO-2-PROPYL ETHER

Chialang Huang, Edison, and Gerald G. Vernice, Nutley, both of N.J., assignors to BOC, Inc., New Providence, N.J.

Filed May 20, 1988, Ser. No. 196,712
Int. Cl.[4] C07C *41/22*
U.S. Cl. 568—683 **2 Claims**

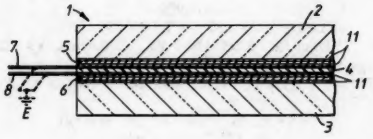
1. A method for the preparation of fluoromethyl 1,1,1,3,3,3-hexafluoro-2-propyl ether comprising reacting methyl 1,1,1,3,3,3-hexachloro-2-propyl ether of or chloromethyl 1,1,1,3,3,3-hexachloro-2-propyl ether with chlorine trifluoride or bromine trifluoride.

ELECTRICAL

4,874,903
SHIELDING PANEL

Leslie T. Clarke, Merseyside, England, assignor to Pilkington PLC, Merseyside, England

Filed May 27, 1988, Ser. No. 199,715
Claims priority, application United Kingdom, Jun. 9, 1987, 8713437
Int. Cl.[4] H05K *9/00*
U.S. Cl. 174—35 MS 15 Claims



1. A translucent electromagnetic shielding panel comprising, in combination,

a first pane of glass or plastic carrying a silver layer on one of its major surfaces, the thickness of the silver layer being up to 30 nm,

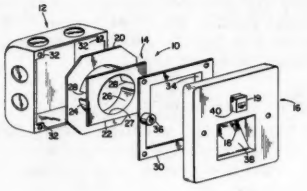
a second pane of glass or plastic carrying a silver layer on one of its major surfaces, the thickness of the silver layer being up to 30 nm, with the first and second said panes being positioned in an opposed, spaced relationship,

and first and second electrical connection means in contact with the periphery of the silver layers on each of said respective first and second panes for providing an electrical connection of the silver layers to earth.

4,874,904
FIBER OPTIC FACEPLATE ASSEMBLY

Raymond J. DeSanti, Worcester, Mass., assignor to Brintec Corporation, Williamantic, Conn.

Filed Apr. 14, 1988, Ser. No. 181,594
Int. Cl.[4] H02G *3/08*
U.S. Cl. 174—53 15 Claims

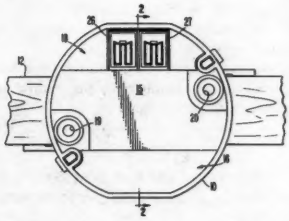


1. A fiber optic faceplate assembly for an outlet box having a frontal opening, said faceplate assembly comprising the faceplate, a fiber optic connector mounted in fixed position on said faceplate, and insert means for positioning within the outlet box and defining a forwardly extending cylindrical bore for receiving and storing in coiled condition an elongated portion of at least one optical fiber coupled to said fiber optic connector, said insert means having a front wall at the forward end of said bore including a frontal aperture therethrough communicating with said bore and through which the one optical fiber is payed into and out of said bore, said frontal aperture having a cross-sectional area smaller than the frontal cross-sectional area of said bore, means for releasably securing said insert within the outlet box and means for releasably attaching said faceplate to the outlet box to form a substantial closure for the frontal opening.

4,874,905
CABLE CLAMPS FOR ELECTRICAL BOX

Kenneth R. Schnell, and Gregory J. Kesler, both of South Bend, Ind., assignors to Hubbell Incorporated, Orange, Conn.

Filed Oct. 31, 1988, Ser. No. 264,877
Int. Cl.[4] H02G *3/08, 15/007*
U.S. Cl. 174—65 R 3 Claims



1. An electrical ceiling box and cable clamp structure, the ceiling box being of the type having means defining an entrance port for an electrical cable, the structure comprising

an elongated tab extending across and substantially closing said entrance port;

hinge means at the proximal end of said tab connecting said tab to said box to permit said tab to be hingedly swung into said box and away from said port so that a cable can be inserted through said port and into said box;

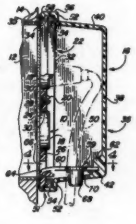
an arcuately curved wall formed on an inner surface of said tab near the distal end of said tab, said curved wall having a concave surface facing generally toward said distal end of said tab and being dimensioned to receive the end of a finger to facilitate swinging said tab into said box; and

means defining a recess at the base of said concave surface of said wall, said recess being shaped and dimensioned to receive the end of a blade screwdriver to facilitate the use of a blade screwdriver to swing said tab into said box.

4,874,906
PLUG ENCLOSING OUTLET COVER

Michael J. Shotey, 7733 E. Cypress, Scottsdale, Ariz. 85257

Continuation of Ser. No. 66,993, Jun. 29, 1987, Pat. No. 4,803,307. This application Dec. 14, 1988, Ser. No. 284,071
The portion of the term of this patent subsequent to Feb. 7, 2006, has been disclaimed.
Int. Cl.[4] H02G *3/18*
U.S. Cl. 174—67 2 Claims



1. A weatherproof cover for an outdoor electrical outlet, said cover comprising:

(a) a waterproof, corrosion-resistant and electrically non-conductive mounting plate;

(b) fastener means for demountably securing said mounting plate to the outlet;

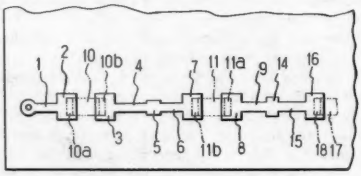
(c) said mounting plate including a lip;

(d) a waterproof, corrosion-resistant lid member for enclosing the outdoor electrical outlet and the plug of at least one electrical cord mountable therein, said lid member being movably attached to said mounting plate and having means formed therein for allowing the electrical cord of the plugged in plug to extend from said lid member;
(e) said lid member including a hook portion depending for engaging said lip to pivotally engage said lid member with said mounting plate;
(f) first sealing member disposed between said mounting plate and the outlet for preventing passage of foreign elements therebetween; and
(g) a second sealing member disposed between said mounting plate and said lid member for preventing passage of foreign elements therebetween.

4,874,907
PRINTED CIRCUIT BOARD

Norio Ishikawa, Kanagawa, Japan, assignor to Mitsubishi Denki K.K., Tokyo, Japan

Filed May 20, 1988, Ser. No. 196,603
Claims priority, application Japan, Jun. 5, 1987, 62-87224[U]
Int. Cl.[4] H05K *1/00*
U.S. Cl. 174—68.5 **4 Claims**

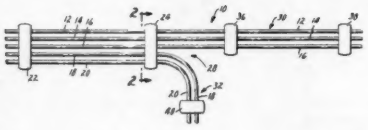


1. A printed circuit board comprising:
a substrate;
a first component connection land provided on a surface of said substrate, to which an end of a first electronic component is to be connected;
a second component connection land provided on said surface, to which an end of a second electronic component is to be connected,
a wiring pattern provided on said surface to link said first and second component connection lands;
a signal output land made from a portion of said wiring pattern; and
a solder-resist layer for covering said printed circuit board except for said first, second, and signal output lands.

4,874,908
WIRING HARNESS

Ronald C. Johansson, Stillwater, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jul. 8, 1987, Ser. No. 67,763
Int. Cl.[4] B60R *16/02*; H02G *3/02*
U.S. Cl. 174—72 A **23 Claims**

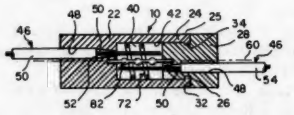


1. A wiring harness and support structure for conveying energy with respect to the support structure, comprising:
(a) at least two wires having opposed ends and arranged in a row for transmitting energy therethrough;
(b) at least two spaced pads extending generally transverse to said wires intermediate said opposed ends of said wires and through which said wires extend in spaced relationship to each other, said pads being molded about said wires; and
(c) mounting means for securing at least two of said pads to said support structure so that said pads support and position said wires with respect to said support structure.

4,874,909
ELECTRICAL SPLICE CONNECTOR

David C. Velke, Sr., 3305 Aldie Rd., Catharpin, Va. 22018; George P. Marsden, 7621 Mary Cassatt Dr., Potomac, Md. 20854, and Burton C. Leffingwell, 242 Meadows Ln., Leesburg, Va. 22075

Filed Sep. 30, 1988, Ser. No. 251,370
Int. Cl.[4] H02G *15/115*
U.S. Cl. 174—845 **17 Claims**



1. A cable connector for uniting the bared ends of conductors of two cables comprising;
main and secondary body sections each having a conductor hole therethrough, said body sections disposed in axial alignment and having inner end faces spaced apart to define a cavity therebetween, means joining said body sections together to alalow angular displacement therebetween,
a grip element within said cavity and having at least one coil terminating in first and second ends,
said body section inner end faces each having holding means thereon angularly offset from said conductor holes and receiving and retaining said grip element ends whereby,
following insertion of two cable conductor ends through said conductor holes and into said cavity within the confines of said grip element coil and subsequently twisting said body sections relative one another, said grip element coil is constricted in a crimped manner about the two conductor ends thereby electrically and mechanically interlocking the conductor ends.

4,874,910
HIGH LEAD DENSITY VACUUM FEEDTHROUGH

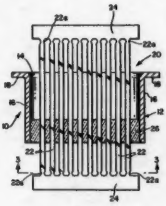
Joseph R. McCoy, Frankfort, N.Y., assignor to Government of the United States as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 22, 1988, Ser. No. 184,678
Int. Cl.[4] H01B *17/26*
U.S. Cl. 174—152 GM **3 Claims**

1. A vacuum feedthrough comprising, in combination;
a case having an open interior defined by a pair of elongated, closely spaced, parallel sidewalls and short, opposed, conjoining endwalls;
said case including first and second opposed, open ends, said case sidewalls and endwalls at said first end being integrally formed having a laterally offset, continuous, perimetrical flange facilitating feedthrough affixation to a vacuum enclosure;
a plurality of leads extending through said case open interior and having opposed ends extending beyond the opposed open ends of said case, said leads being arranged in closely spaced, parallel, side-by-side relation in a linear array

oriented parallel to and equi-distant between said sidewalls;

a hermetic glass seal closing off said case open interior and effecting a lead-to-glass seal, said glass seal being located adjacent said second open end in spaced relation to said first open end of said case so that it occupies the case from said second open end to a fraction of the distance to the first open end;



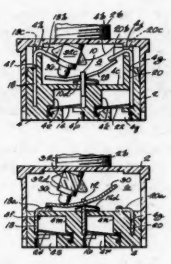
said plurality of leads being in the form of a lead frame created from a metallic sheet having a planar array of closely spaced, coextensive rectangular leads integrally interconnected at the opposed ends thereof by separate headers. the leads having junctions with the headers at each end which are relieved to create weak points, said headers being severed from said lead ends at said junctions subsequent to the formation of said glass seal.

4,874,911

ELECTRICAL REVERSING SWITCH

Timothy L. Parrish, Kenly, N.C., assignor to Eaton Corporation, Cleveland, Ohio

Filed Mar. 28, 1988, Ser. No. 173,893
Int. Cl.[4] H01H *9/00*
U.S. Cl. 200—6 R **8 Claims**



1. An electrical reversing switch having an insulating housing wherein a pair of switch poles are arranged side-by-side, each pole having a pair of spaced stationary contacts, a fulcrum contact disposed intermediate said stationary contacts, and a rocking contactor supported on said fulcrum contact pivotally movable in opposite directions to cause opposite ends thereof to engage one or the other of said pair of stationary contacts, and an actuator pivotally mounted in said housing having means resiliently engaging an upper surface of said contactor in each pole, said means traversing said upper surface of each said contactor across a plane of the respective fulcrum contact as said actuator is pivoted, said actuator assuming stable positions at either side of said fulcrum contacts wherein said means drives a respective contactor into engagement with a respective one or the other of said stationary contacts, characterized in that:

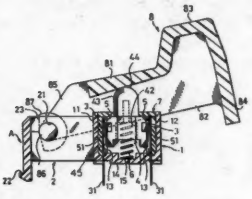
said stationary contacts in one pole are disposed below the respective contactor and stationary contacts in the other pole are disposed above the respective contactor, said contactor of one switch pole engaging a stationary contact of said one switch pole on one side of said fulcrum contact of said one switch pole, and said contactor of the other switch pole engaging a stationary contact of said other switch pole on an opposite side of said fulcrum contact of said other switch pole when said actuator assumes one of said stable positions.

4,874,912

HOOK SWITCH

Toshio Kakuta, Higashiosaka, and Hiroyuki Nagano, Kadoma, both of Japan, assignors to Hosiden Electronics Co., Ltd., Osaka, Japan

Filed May 19, 1988, Ser. No. 196,056
Claims priority, application Japan, Jul. 28, 1987, 62-115403
Int. Cl.[4] H01H *15/02, 3/02*
U.S. Cl. 200—16 D **10 Claims**



1. A hook switch, comprising:

a box-shaped body having a bottom wall and an open end;

at least one fixed contact piece having a contact surface located within said body;

a slider slidably received within said body, and having a protrusion with a spherical top protruding through said open end of said body;

at least one movable contact piece which elastically contacts the contact surface of said at least one fixed contact piece when the slider slides in said body;

a spring located between the slider and the bottom wall of said body, said spring exerting a biasing force in a direction to put the slider out from said at least one opening;

a cover mounted on the open end of said body to prevent the slider from slipping out of said body due to said biasing force of said spring, said cover having a through-hole formed therein through which said protrusion of said slider is inserted;

an arm extending outwardly from said body, said arm defining a tip; and

an actuator supported rotatably on the tip of said arm, said actuator having a top wall which abuts against said protrusion of said slider.

4,874,913

LUMINOUS ELEMENT HOLDING STRUCTURE FOR AN ILLUMINATED KEY SWITCH

Kazuo Aoki, and Sadao Tachibana, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Apr. 22, 1988, Ser. No. 189,134
Claims priority, application Japan, Apr. 30, 1987, 62-65340[U]
Int. Cl.[4] H01H *9/16*; F21V *33/00*
U.S. Cl. 200—314 **3 Claims**

1. A luminous element holding structure of an illuminated key switch, said structure comprising:

a base plate;

a switch element disposed on said base plate,

said switch element having a pair of contacts, a switch ele-

ment recess extending therein, and a pair of electrodes fixed thereto in said recess;

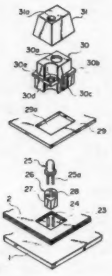
a holding plate disposed over said switch element and having a holding plate through hole extending therethrough;

a housing mounted to said holding plate within said holding plate through hole and resting on said switch element,

said housing having a hollow substantially cubic body with a housing recess defined in one corner thereof, a peripheral flange extending around said body at a mid-portion thereof and seated on a surface of said holding plate, a housing through hole extending through the upper wall of the cubic body, a pair of catches disposed on opposite sides of said cubic body and engaging said holding plate at a surface thereof opposite the surface of said holding plate on which said peripheral flange is seated, and a partial flange extending in said housing recess along a plane common to a plane in which said peripheral flange is disposed and partitioning said housing recess into an upper recess portion and a lower recess portion,

said partial flange having a partial flange through hole extending therethrough;

a key movably supported by said housing for actuating said pair of contacts,



said key having a hollow substantially prismoidal head including a transparent window, and a stem extending from said head toward said contacts;

a luminous element holder having a first portion adjacent said housing in said lower recess portion and a second portion adjacent an edge of said switching element defining said switching element recess, said first portion having a shape complimentary to said lower recess portion,

said luminous element holder comprising an insulating member and a pair of conductive members,

said insulating member including a head portion that is adjacent said edge of said switching element, has a shape complimentary thereto and constitutes the entire said second portion of the luminous holder, and a leg portion extending from said head portion,

said conductive members attached to said insulating member, disposed at opposite sides of said leg portion, contacting said electrodes, respectively, and each having a holder through hole extending therein; and

a luminous element including a luminous head extending through said partial flange through hole, and a pair of lead wires each of which extends form said luminous head into a respective said holder through hole.

4,874,914

MICROWAVE OVENS AND METHODS OF DEFROSTING FOOD THEREIN

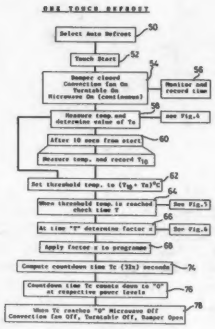
Kenneth I Eke, Woldingham, England, assignor to Microwave Ovens Limited, Shirley, England

Filed Jan. 26, 1989, Ser. No. 301,464

Claims priority, application United Kingdom, Feb. 5, 1988, 8802575

Int. Cl.[4] H05B *6/68*

U.S. Cl. 219—10.55 M **14 Claims**



1. A method of defrosting a frozen food item in a microwave oven, comprising the steps of:

placing the food item in a cavity of the oven;

recirculating air through said cavity throughout a defrosting period including first and second defrosting stages;

taking an initial ambient temperature sensing of said recirculating air;

introducing continuous microwave power into said cavity to heat the food item;

determining a threshold temperature, said steps of recirculating air, introducing continuous microwave power, and taking an initial ambient temperature sensing occurring substantially simultaneously to begin said first defrosting stage and said step of determining a threshold temperature occurring at a predetermined time after the beginning of said first defrosting stage;

monitoring the temperature of the recirculating air;

measuring elapsed time from beginning said first defrosting stage until the temperature of the recirculating air reaches said threshold temperature;

terminating said first defrosting stage when the temperature of the recirculating air reaches said threshold temperature;

calculating the duration of said second defrosting stage;

initiating said second defrosting stage, said second defrosting stage further comprising the steps of maintaining the continuous flow of recirculating air and introducing pulsed microwave power into said cavity; and

terminating said defrosting period.

4,874,915

APPARATUS FOR THE RAPID MICROWAVE THAWING OF CRYOPRESERVED BLOOD, BLOOD COMPONENTS, AND TISSUE

Frank M. Harms, Marietta; Victor Tripp, Tucker, and Thomas B. Wells, Smyrna, all of Ga., assignors to Lifeblood Advanced Blood Bank Systems, Inc., Atlanta, Ga.

Filed Dec. 30, 1988, Ser. No. 292,574

Int. Cl.[4] H05B *6/80*

U.S. Cl. 219—10.55 F **64 Claims**

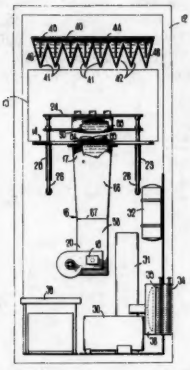
1. An apparatus for thawing a frozen material, comprising:

a microwave generator selectively operable to generate microwaves;

a hollow waveguide for confining and guiding said microwaves to propagate in a plurality of odd-numbered modes of propagations, aid waveguide defining an axis of propagation and being configured such that at a predetermined point along said axis of propagation the cumulative effect of said plurality of odd-numbered modes of propagation creates an approximately uniform electromagnetic field across a predetermined transverse cross section of said waveguide, said waveguide further defining a reservoir therein such that said reservoir can be filled with a liquid dielectric medium;

a first flexible membrane for supporting a frozen material to be thawed thereupon, said first flexible membrane being disposed transversely to said axis of propagation at said predetermined point along said axis of propagation; and

a cap assembly having an opening at one end thereof and defining a cavity therein, said cap assembly including a second flexible membrane sealing said opening at said one end of said cap assembly such that said cavity in said cap assembly is capable of containing a liquid therein, and said



cap assembly being mounted adjacent said hollow waveguide and translatable to bring said second flexible membrane at said one end of said cap assembly into engagement with a frozen material to be thawed supported on said first flexible membrane;

whereby when said material to be thawed is positioned between said first and second flexible membranes and said cap assembly is translated, said flexible membranes intimately conform to said material to be thawed such that said first and second membranes completely encapsulate said material to be thawed;

whereby when said material to be thawed is so encapsulated between said first and second flexible membranes and said reservoir in said hollow waveguide and said cavity in said cap assembly are filled with a liquid dielectric medium, said material to be thawed is surrounded by said liquid dielectric medium; and

whereby said electromagnetic field at said predetermined point along said axis of propagation heats said material to be thawed.

4,874,916

INDUCTION HEATING AND MELTING SYSTEMS HAVING IMPROVED INDUCTION COILS

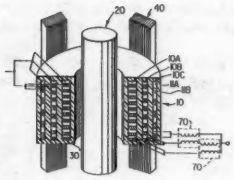
Patrick E. Burke, North York, Canada, assignor to Guthrie Canadian Investments Limited, Scarborough, Canada

Continuation-in-part of Ser. No. 875,884, Jun. 13, 1986, abandoned. This application Nov. 30, 1987, Ser. No. 127,537

Claims priority, application Canada, Jan. 17, 1986, 499813

Int. Cl.[4] H05B *6/42*

U.S. Cl. 219—10.75 **46 Claims**



1. In electric inductive heating apparatus an improved inductive coil comprising a rigid open ended sleeve-like coil unit that includes two or more co-axial, co-extensive helical coil windings embedded in a temperature resistant, reinforced resin, each of said coil windings comprising a plurality of helical turns of multi-strand insulated conductor, means for connecting said coil windings in parallel and current balancing means operative in response to current flow respective ones of said coil windings thereby automatically forcing said coil windings to maintain a selected predetermined share of current flow including during variations of load and/or frequency.

4,874,917

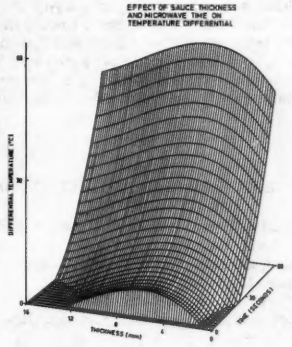
MICROWAVE FOOD PRODUCT AND METHOD OF MANUFACTURE

John R. Weimer, Stacy, Minn., assignor to The Pillsbury Company, Minneapolis, Minn.

Filed Oct. 23, 1986, Ser. No. 922,573

Int. Cl.[4] H05B *6/80*

U.S. Cl. 219—10.55 M **42 Claims**


EFFECT OF SAUCE THICKNESS AND MICROWAVE TIME ON TEMPERATURE DIFFERENTIAL
DIFFERENTIAL TEMPERATURE (°C)
THICKNESS (mm)
TIME (SECONDS)

1. A method of making a food product for use in a microwave oven, said method including:

(a) positioning at least one edible product in a container having at least one conductive member associated therewith forming a waveguide, said container having at least a portion thereof sufficiently transparent to microwave radiation to permit microwave radiation to enter said container and expose said at least one edible product therein to microwave radiation; and

(b) adjusting the impedance sufficiently of said at least one

edible product such that upon exposure to microwave radiation said at least one edible product heats within a preselected temperature relationship range and after a time period of exposure to microwave radiation reaches a preselected temperature within a preselected temperature range.

4,874,918

VACUUM BRAZING APPARATUS

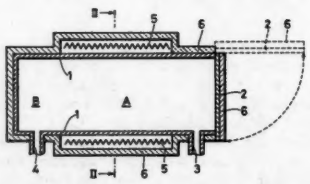
Osamu Okubo; Takeo Kato, and Tetsurou Tsushima, all of Kanagawa, Japan, assignors to Nihon Sinku Gijutsu Kabusiki Kaisha, Kanagawa and Nippondenso Co., Ltd., Aichi, both of, Japan

Filed Feb. 12, 1988, Ser. No. 155,288

Claims priority, application Japan, Feb. 14, 1987, 62-31815; Feb. 14, 1987, 62-31816

Int. Cl.[4] B23K *1/02*

U.S. Cl. 219—85.11 **14 Claims**



1. A vacuum brazing apparatus comprising:

a vacuum chamber the internal space of which consists of two regions, said regions being formed by the flow of an inert gas, the first region of said two regions being communicating with an inlet opening, in said first region are placed articles provided with brazing material being heated to be brazed with each other, the second region of said two regions being communicating with a discharge opening; and heating means arranged outside of an outer peripheral wall as to correspond to said first region in said vacuum chamber for heating said articles to be brazed, wherein metallic components of said brazing material emitted from said articles during the brazing operation are caused to flow from said first region toward said second region, the temperature of which is lower than that of said first region, by a flow of inert gas introduced from said inlet opening, and are coagulated on an internal wall of said vacuum chamber corresponding to said second region.

4,874,919

LASER APPARATUS FOR REPETITIVELY MARKING A MOVING SHEET

Antony S. Bransden, Grove; John H. P. C. Megaw, Shillingford; Malcolm J. Terry, Steventon, and Brooke A. Ward, Goring, all of England, assignors to The Wiggins Teape Group Limited, Basingstoke, England

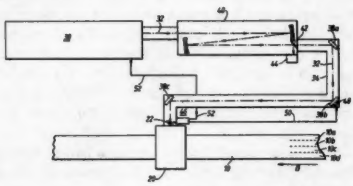
Filed Jan. 14, 1988, Ser. No. 143,950

Claims priority, application United Kingdom, Jan. 14, 1987, 8700765

Int. Cl.[4] B23K *26/00*

U.S. Cl. 219—121.68 **44 Claims**

1. An optical apparatus for use in producing an image on a moving sheet of material, comprising a beam entry point for receiving a laser beam in a predetermined alignment, at least one mask-receiving means for receiving a mask bearing an image, optical means including first and second optical elements carried by a structure repetitively movable in a predetermined path to intercept the beam at different times in each such movement to switch the beam to the at least one mask-receiving means, and said optical means being adapted to focus the received laser beam to a line at the mask-receiving means to which the beam is switched, the mask-receiving means and optical means being so arranged to provide a relative motion



between the line and the mask-receiving means at which it is focussed for scanning a mask received therein.

4,874,920

ELECTRONIC DEVICE MANUFACTURING METHODS

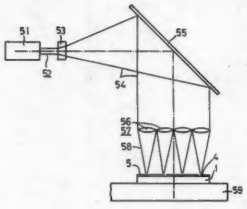
Shunpei Yamazaki; Kenji Itoh, and Susumu Nagayama, all of Tokyo, Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 62,596, Jun. 16, 1987, abandoned, which is a division of Ser. No. 740,764, Jun. 3, 1985, Pat. No. 4,713,518. This application Jan. 13, 1989, Ser. No. 298,263

Claims priority, application Japan, Jun. 8, 1984, 59-117538; Oct. 8, 1984, 59-211769

Int. Cl.[4] B23K *26/00*

U.S. Cl. 219—121.85 **9 Claims**



1. A laser scribing method for producing a plurality of grooves on a semiconductor layer comprising:

expanding laser light emitted from an eximer laser with respect to the cross-section of the laser light;

contracting the expanded laser light in only one direction by a convex lens;

focusing the contracted laser light on said semiconductor layer; and

subliming a part of said semiconductor layer

wherein said convex lense is the lense nearest the semiconductor layer forming a focal point where said subliming takes place.

4,874,921

PORTABLE AUXILIARY AUTOMOBILE HEATER

Barry V. Gerbig, Jr., P.O. Box 2712, Middlebury, Vt. 05753

Filed Jun. 19, 1987, Ser. No. 64,082

Int. Cl.[4] B60L *1/02*

U.S. Cl. 219—202 **1 Claim**

1. A new and improved portable automotive heater for pre-heating a passenger compartment of an automobile comprising a housing further including therein,

(a) a heated air outlet means, and

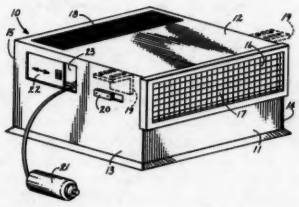
(b) an air intake means, and

(c) a timing mechanism wherein said timing mechanism includes a digital timer/clock including an independent power supply means independent of a plural selective

electrical power supply means for providing electrical energy to said timing mechanism, and

(d) said plural selective electrical power supply means including an AC power input supply means and a DC electrical input supply means for providing electrical power to said automotive heater when said timing mechanism permits flow of electrical power to thereby provide heated air directed from said outlet means, and

said plural selective power supply means further includes an AC/DC switch enabling selective use of either said AC



electrical power supply means or DC power supply means to direct electrical power to said automotive heater, and

a compartment is provided in said housing for storage for said DC power supply means, and

a selective on/off switch provided on said housing enabling selective energization or de-energization of power to said portable automotive heater, and

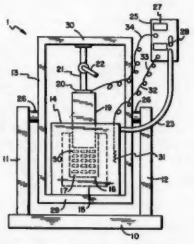
bracketry means is positioned on said automotive pre-heater housing for attachment of said automotive heater to a passenger compartment of an automobile.

4,874,922

GRANULE VISE FOR MANUFACTURING A MAGNETIC HEAD CORE WITH A GLASS FILLET ADJACENT THE INNER EDGE OF THE GAP

Timothy W. Vadnais, Victoria, and Douglas J. Hennenfent, Minneapolis, both of Minn., assignors to Impris Technology Incorporated, Minnetonka, Minn.

Filed Nov. 30, 1988, Ser. No. 277,732
Int. Cl.[4] H05B *1/00*
U.S. Cl. 219—243 **1 Claim**



1. Apparatus for simultaneously bonding individual ones of ferrite I bars to individual ones of ferrite C bars to form a plurality of O bars each having approximately the exterior shape of a rectangular prism from which individual head cores may be cut, each said O bar having an interior opening which extends the length of the O bar and a non-magnetic flux gap layer extending the length of the O bar between opposing faces of the I and C bars and along the interior opening, said flux gap layer having an interior edge bordering the interior opening and a length defined by the thickness of the flux gap layer, each said O bar further requiring a fillet along the flux gap interior edge to be formed upon melting, by application of heat, of a rod of bonding material within the O bar interior opening, comprising

(a) a base having a pair of projecting spaced apart arms;

(b) a rigid frame mounted between the projecting arms for rotation about a horizontal axis, said frame having spaced apart mounting beams;

(c) a heat resistant cylinder block attached to one mounting beam of the frame and having a cylindrical cavity therein opening toward the other mounting beam, and with the axis of the cylindrical cavity directed toward the other mounting beam;

(d) a quantity of rigid, heat resistant granules at least partly filling the cylindrical cavity, in which the individual unbonded O bars may be embedded with their gap length dimension substantially parallel to the axis of the cavity and their length dimension substantially parallel to the axis of rotation of the frame;

(e) a heat resistant pressure die having an external cylindrical shape substantially conforming to the cylindrical cavity and adapted to slide into the cylindrical cavity;

(f) compressing means mounted on the other mounting beam for forcing the pressure die into the cylindrical cavity to compress the granules, and

(g) heating means mounted on the one mounting beam in surrounding relation to the cylinder block for heating the contents of the cylinder block cavity;

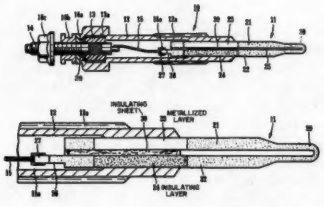
wherein activating the compressing means forcing the pressure die against the granules and rotating the frame to orient each unbonded O bar with the interior edge of its flux gap at the lowest point within the interior opening of each O bar, allows the rod of bonding material within its interior opening to fall into a position adjacent to the interior edge of the flux gap, to thereby cause the bonding material rod to form the fillet adjacent the flux gap upon activating the heating means.

4,874,923

GLOW PLUG FOR DIESEL ENGINE WITH A U-SHAPED SIALON CERAMIC HEATER

Koji Hatanaka; Kenzi Maruta, and Hirohisa Suwabe, all of Saitama, Japan, assignors to Jidosha Kiki Co., Ltd. and Hitachi Metals, Ltd., both of Tokyo, Japan

Continuation of Ser. No. 170,673, Mar. 18, 1988, abandoned, which is a continuation of Ser. No. 3,494, Jan. 15, 1987, abandoned. This application Apr. 28, 1989, Ser. No. 346,382
Claims priority, application Japan, Jan. 22, 1986, 61-9933
Int. Cl.[4] F23Q *7/22*; F02P *19/00*; H05B *3/00*; H01C *1/14*
U.S. Cl. 219—270 **6 Claims**



1. A glow plug for a diesel engine, comprising an elongated hollow metallic holder,

a ceramic heater having a U-shape as a whole and supported by said hollow holder, so as to project from one end thereof, wherein said ceramic heater is obtained by adding titanium nitrate to SIALON or α-β SIALON so that its characteristics are varied from insulating to conducting,

an external electrical connecting terminal extending into the other end of said holder,

means for electrically connecting an end of said ceramic heater to said external connecting terminal, and

an insulating member supporting said external connecting terminal in an electrically insulated condition with respect to said hollow holder, wherein

said ceramic heater includes a U-shaped heating portion of resistive ceramic material projecting outwardly from said one holder end, and a pair of lead portions of a resistive ceramic material integral with and extending backward from the ends of said U-shaped heating portion and parallel to each other, said lead portions being spaced from each other to define a slit therebetween open to the interior of the hollow holder, said U-shaped heating portion and part of said lead portions projecting outwardly from said one end of said holder, wherein said U-shaped heating portion has a thickness less than that of said lead portions,

one lead portion being connected electrically to the interior of said hollow holder, and the other lead portion being electrically insulated from said hollow holder and electrically connected to said external connecting terminal through the interior of said hollow holder via said connecting means, and

a sintered ceramic sheet of SIALON which is integrally bonded to at least portion of said pair of lead portions for sealing said slit formed between said lead portions and to seal the interior of the hollow holder against entry of combustion gases.

4,874,924

PTC HEATING DEVICE

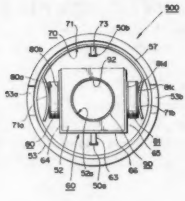
Shinobu Yamamoto; Fumitoshi Hoshide, both of Hiroshima; Michikazu Takeuchi, Tokyo; Shou Kotani, Tokyo, and Sumihiro Yasuda, Tokyo, all of Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Apr. 19, 1988, Ser. No. 183,710

Claims priority, application Japan, Apr. 21, 1987, 60163; Nov. 16, 1987, 174598

Int. Cl.[4] H05B *3/14;* A61L *9/03*

U.S. Cl. 219—274 **13 Claims**



1. A PTC heating device for incorporation in electric vaporizer apparatus for heating and vaporizing liquid material, said electric vaporizer apparatus including storage means for containing said liquid material therein, a wick for drawing said liquid material from said storage means therethrough, and a case for housing said storage means therein, said wick having an elongated body for immersion in said liquid material in said storage means, one end portion of said elongated body projecting from said storage means, comprising:

a casing of heat-resistant electrically insulating material having a recess formed therein and a heat-conducting portion made of electrically insulating material having good thermal conductivity and formed integrally with said casing in a manner to vertically protrude from an outer surface of a bottom of said recess toward an opened side of said casing;

said heat-conducting portion having a vertical through-hole of a substantially cylindrical shape and a pair of planar surfaces formed on opposite portions of an outer surface of a wall surrounding said through-hole;

two substantially plate-like PTC thermistors each having a first electrode and a second electrode on respective first and second surfaces, thereof;

a first electrode member comprising a pair of spaced apart planar contact sections and an intermediate section interconnecting said spaced apart planar contact sections;

said first electrode member disposed in said recess of said casing with said planar contact sections having said heat-conducting portion interposed therebetween to form a surface of said heat-conducting portion;

each of said PTC thermistors disposed in said recess of said casing in a manner to be located on one of said planar contact sections of said first electrode member to form a surface contact with the planar contact section at said second electrode;

means on each of said planar contact sections of said first electrode member for preventing movement of a PTC thermistor in contact therewith;

a second electrode member formed of elastic material disposed in said recess of said casing and having means for engaging said respective first electrodes of said PTC thermistors on said planar contact sections of said first electrode member to elastically press said PTC thermistors onto respective planar surfaces of said heat-conducting portion through said planar contact section of said first electrode member;

a cover plate having a through-hole and located on said opened side of said casing;

means for mounting said PTC heating device with said case of said electric vaporizer extending therethrough and arranged on said cover plate;

said mounting means comprising a plate-like body having a through-hole formed therein, and a plurality of arms extending radially from peripheral portions of said platelike body;

a heat-radiating member of a substantially cylindrical shape mounted to said casing in a manner to be inserted through said through-hole of said mounting means, said cover plate and said heat-conducting portion, said cylindrical heat-radiating member having a bore for receiving said one end portion of said wick when said PTC heating device is incorporated in said electric vaporizer apparatus;

first cooperating means on said cover plate and said casing for preventing a rotational movement of said cover plate on said casing; and

second cooperating means on said mounting means and said cover plate for preventing a rotational movement of said mounting means on said cover plate.

4,874,925

ELECTRICALLY HEATED HOSE ASSEMBLY FOR CONVEYING ELECTRICALLY CONDUCTIVE LIQUIDS

Wilk A. Dickenson, 2149 Beech St., Abilene, Tex. 79601

Filed Jun. 1, 1987, Ser. No. 56,433

Int. Cl.[4] H05B *1/02, 3/58;* F24H *1/12*

U.S. Cl. 249—301 **13 Claims**

1. A hose assembly comprising:

a hose member for conveying an electrically conductive liquid therethrough, said member including an outer layer of material and an inner layer of electrically insulative material, said inner layer of electrically insulative material forming a cavity for conveying said electrically conductive liquid;

a first electrically conductive member positioned within said cavity so as to be exposed to any electrically conductive liquid conveyed by said hose member and extending as a continuous member along substantially the entire length of said hose member;

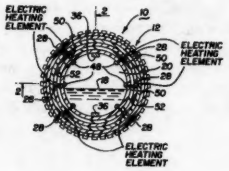
means for operatively connecting said first electrically conductive member to a first terminal of a power source;

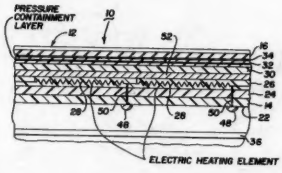
a plurality of heating elements having a first terminal and a second terminal with at least one of said plurality of heating elements being positioned in a separate section of

predetermined length of said hose member along the length of said hose member to independently provide heat to each separate section, said plurality of heating elements being positioned between said outer and inner layers of material of said hose member;

means for operatively connecting said first terminal of each of said plurality of heating elements to a second terminal of the power source;

a plurality of second electrically conductive members with at least one of said plurality of second electrically conductive members being positioned within the cavity in each separate section of hose member of predetermined length and positioned so as to be exposed to any electrically conductive liquid conveyed by said hose member; and





means for operatively connecting each of the at least one of said plurality of second electrically conductive members positioned in each separate section of hose member to said second terminal of each of the at least one of said plurality of heating elements positioned in each separate section of hose member,

whereby the presence of an electrically conductive liquid in a separate section of the hose member provides electrical continuity between the at least one second electrically conductive member in said section and said continuous first electrically conductive member to complete the electrical circuit to the at least one heating element in said separate section to cause heating of said separate section of said hose member.

4,874,926

ELECTRIC HEATING LOAD MANAGEMENT CONTROL

Steven B. Sanders, 69 Tiemann Pl., New York, N.Y. 10027

Filed Aug. 17, 1988, Ser. No. 233,717
Int. Cl.[4] H05B *1/02*
U.S. Cl. 219—486 **5 Claims**

1. In a residential electrical heating system of the type that includes

an individual electrical heating element in each of a plurality of rooms in a residence,

a multiline circuit breaker having one side thereof connected to a remotely generated source of electrical power and a second side providing a plurality of power distribution outlets,

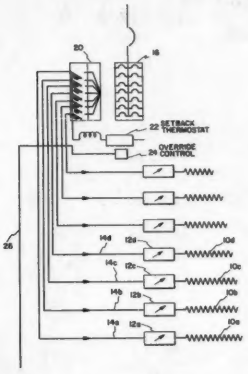
an individual electrical power transmission line extending within said residence from a power distribution outlet on said circuit breaker to each of said heating elements and

a manually settable thermostat disposed in each of said power transmission lines for controlling the transmission of electric power to each said heating element in response to a desired ambient temperature condition within said room,

improved load management control means comprising

a normally closed low voltage controllable thermal relay interposed in each said power transmission line intermediate the power distribution outlet on said circuit breaker and said manually settable thermostat therein,

means disposed in said residence and settable by the occupant of the residence for shifting said normally closed thermal relays to the open condition independent of the



ambient temperature conditions in said heating element containing rooms for precluding the flow of electrical power through said power transmission lines under predetermined residential dictated parameters of operation and

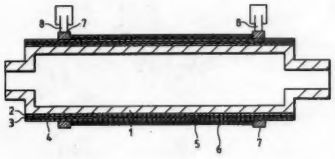
signal generating means disposed remote from said residence for selectively and independently actuating said shifting means in response to extrinsic system load management parameters to open said thermal relays to preclude transmission of electric power to said electrical heating elements in said residence.

4,874,927

HEATING ROLL FOR FIXING TONER

Ryoichi Shibata, and Toshiyuki Kasakoshi, both of Saitama, Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Filed Jun. 7, 1988, Ser. No. 203,121
Claims priority, application Japan, Jun. 9, 1987, 62-143560
Int. Cl.[4] G03G *15/20*
U.S. Cl. 219—469 **3 Claims**



1. In a heating roll for fixing toner of the type in which a heating resistor layer is provided on the circumference of a cylindrical substrate so that when a voltage is applied to the heating resistor layer through an electrode, the heating resistor layer generates heat, wherein the improvement comprises the heating resistor layer being constituted by an Fe-Cr-Al alloy phase dispersed into a ceramic substrate phase, said Fe-Cr-Al alloy phase being electrically continuous in the axial direction

of said heating roll said Fe-Cr-Al alloy comprising 64–89 wt % of Fe, 10–30 wt. % of Cr, and 2–10 wt. % of al.

4,874,928

A HEATING APPARATUS FOR AUTOMATICALLY DISTINGUISHING THE CONDITION OF FOOD TO BE REHEATED

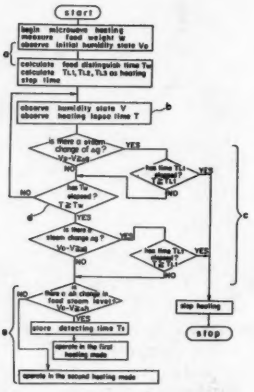
Isao Kasai, Nara, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

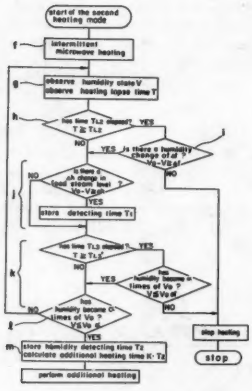
Filed Apr. 29, 1988, Ser. No. 188,539

Claims priority, application Japan, Apr. 30, 1987, 62-106631; Jul. 20, 1987, 62-180466

Int. Cl.[4] H05B *6/68*

U.S. Cl. 219—492 **9 Claims**


start
begin microwave heating
measure food weight W
observe initial humidity state Vo
calculate food distinguish time Ts
calculate T1, T2, T3 as heating stop time
observe humidity state V
observe heating lapse time T
is there a sudden change of eq ?
Vo-V≥α
has time T1 elapsed ?
T ≥ T1
has Ts passed ?
T ≥ Ts
YES
NO
is there a steam change eq ?
Vo-V≥α
has time T2 elapsed ?
T ≥ T2
is there a sh change in food steam level ?
Vo-V≥α
stop heating
stop
store detecting time Ts
operate in the first heating mode
operate in the second heating mode


start of the second heating mode
intermittent microwave heating
observe humidity state V
observe heating lapse time T
has time T1.2 elapsed ?
T ≥ T1.2
is there a humidity change of α ?
Vo-V≥α
is there a sh change in food steam level ?
Vo-V≥α
store detecting time T1
has time T1.3 elapsed ?
T ≥ T1.3
has humidity become β times of Vo ?
V≤Vo·β
has humidity become δ times of Vo ?
V≤Vo·δ
stop heating
stop
store humidity detecting time T2
calculate additional heating time K·T2
perform additional heating

1. An automatic heating apparatus comprising:

a heating means for heating an object, said heating means operable in a plurality of different heating modes;

a first sensor means for detecting the weight of an object;

a second sensor means for detecting the amount of gas or steam generated by an object as the object is heated by said heating means;

a control means operatively connected to said heating means, said first sensor means and said second sensor means for performing a heating controlling operation during which said control means controls said heating means to operate in one of said heating modes by selecting said one of said heating modes based on the weight detected by said first sensor means and the amount of gas or steam detected by said second sensor means;

an input means operatively connected to said control means for inputting a command to said control means to initiate said heating controlling operation; and

said control means including a calculation means for calculating a detection time period based on the weight of an object detected by said first sensor means at the initiation of said heat controlling operation, a timer means for measuring the time that has lapsed from the initiation of said heating controlling operation, a comparison means for comparing the change in the amount of steam or gas detected by said second sensor means from the initiation of said heating controlling operation until said detection time period lapses with a predetermined value, identification means for categorizing the object based on the comparison made by said comparison means, and selecting means for selecting one of said heating sequences based on the categorization of the object by said identification means.

4,874,929

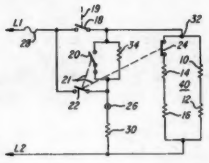
TOASTER OVEN/BROILER WITH CONTINUOUSLY ENERGIZED INDICATOR

Philip H. Houser, Chillicothe, Ohio, assignor to Proctor-Silex, Inc., Glen Allen, Va.

Filed Nov. 24, 1987, Ser. No. 124,733

Int. Cl.[4] H05B *1/02*

U.S. Cl. 219—506 **18 Claims**



1. A control and indicator circuit for a kitchen appliance operable in a toast mode and an oven mode and having first and second leads for connecting said appliance to a voltage source, said circuit comprising:

a toast mode switch for initiating said toast mode;

heating means connected between said toast mode switch and said second lead whereby said heating means is continuously energized during said toast mode;

thermostatic switch means having contacts connected in parallel with said toast mode switch and in series with said heating means, said thermostatic switch means being responsive to heat generated by said heating means for selectively deenergizing said heating means during said oven mode by opening said contacts to control the temperature in said appliance;

control switch means and an indicator circuit means including indicator means connected in a series circuit between said first and second leads, said control switch means being closed only during said oven mode; and,

resistor means connected at one side to said toast mode switch, said thermostatic switch means and said heating means and connected at the other side to said series circuit intermediate said control switch means and said indicator means.

4,874,930

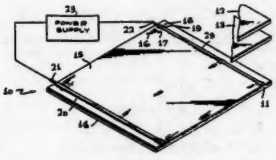
ELECTROCONDUCTIVE FILM SYSTEM FOR AIRCRAFT WINDOWS

David L. Voss, Van Nuys; Howard S. DeCamp, Northridge, and Gordon W. Culp, Van Nuys, all of Calif., assignors to Sierracin Corporation, Sylmar, Calif.

Continuation of Ser. No. 529,975, Sep. 7, 1983, Pat. No. 4,707,586, which is a continuation-in-part of Ser. No. 262,494, May 11, 1981. This application Aug. 13, 1987, Ser. No. 85,123

Int. Cl.[4] H05B *3/06*

U.S. Cl. 219—522 7 Claims



1. A composite transparency comprising:

(a) an outer layer of rigid, transparent, electrically-insulating material having an inner major surface;

(b) a transparent electrically-insulating basecoat on the inner major surface of the outer layer and secured thereto;

(c) a plurality of spaced-apart electroconductive metal film runs comprising a strike coat portion vacuum deposited in adhering relationship onto the basecoat and an electroplated portion electrodeposited onto the strike coat portion; and

(d) a transparent interlayer of relatively flexible electrically-insulating plastic bonded to the transparent basecoat on the inner major surface of the outer layer to thereby sandwich the spaced-apart electroconductive metal film runs between the basecoat and the interlayer.

4,874,931

METHOD FOR AUTOMATIC BILL HANDLING AND BILL CONTAINER USED THEREFOR

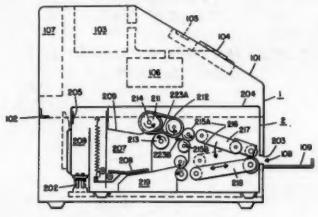
Yoshinobu Oka, Yokohama, and Koichi Sato, Fujisawa, both of Japan, assignors to International Business Machines Corp., Armonk, N.Y.

Filed Sep. 14, 1988, Ser. No. 244,680

Claims priority, application Japan, Sep. 17, 1987, 62-231259

Int. Cl.[4] G06F *15/30*

U.S. Cl. 235—379 7 Claims



1. An automatic bill handler including a main body and means associated with said main body for entering user data and instructions and for determining the validity or invalidity thereof, said bill handler further adapted to receive a detachable bill container which comprises:

a bill hopper;

conveyor means for moving bills from said bill hopper and stacking said bills in a temporary bill storage area;

sensor means associated with said conveyor means for sensing bills;

a bill outlet for the discharge of bills from said bill container;

a withdrawal bill storage area;

additional conveyor means for moving said bills from said temporary bill storage area to either said bill outlet or said withdrawal bill storage area depending upon said determination of the validity or invalidity of said user data and instructions.

4,874,932

CARD AUTHORIZATION TERMINAL

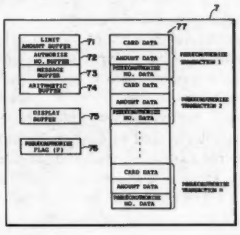
Ryuichi Kimiza, Ootsu, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Sep. 21, 1988, Ser. No. 247,348

Claims priority, application Japan, Sep. 26, 1987, 62-241155; Sep. 26, 1987, 62-241156; Oct. 9, 1987, 62-255661

Int. Cl.[4] G06F *15/30*

U.S. Cl. 235—379 13 Claims



1. A card authorization terminal, comprising:

(a) reading means for reading card data;

(b) inputting means for inputting transaction amount data;

(c) authorization processing means for transmitting card data read by said reading means and transaction amount data inputted by said inputting means to a host computer for authorization request and by receiving and displaying authorization results transmitted from the host computer, when the transaction amount data inputted by said inputting means satisfies authorization requirement conditions;

(d) pseudoauthorization processing means for effecting a pretended authorization processing by displaying predetermined pseudoauthorization results without transmitting an authorization request to the host computer, when the transaction amount data inputted by said inputting means satisfies pseudoauthorization conditions;

(e) storing means for storing card data read by said reading means and transaction amount data inputted by said inputting means whenever a pseudoauthorization processing is effected by said pseudoauthorization processing means;

(f) detecting means for detecting whether card data and transaction amount data are stored in said storing means; and

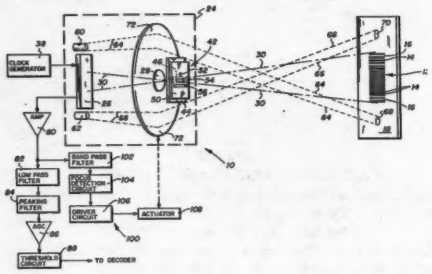
(g) controlling means for allowing said detecting means to detect whether card data and transaction amount data are stored in said storing means when an authorization processing is effected by said authorization processing means, and for transmitting data stored in said storing means to the host computer, without interrupting communications after an authorization processing by said authorization processing means, when data storage is detected by said detecting means.

4,874,933

AMBIENT ILLUMINATION BAR CODE READER

Medford D. Sanner, Irving, Tex., assignor to Recognition Equipment Incorporated, Dallas, Tex.

Filed Aug. 21, 1987, Ser. No. 88,397
Int. Cl.[4] G06K *7/10*
U.S. Cl. 235—470 **11 Claims**



1. A bar code scanner for scanning bar codes having a plurality of parallel bar symbols recorded in contrastive light reflecting properties and for converting optically readable information into an electrical signal comprising:

an image sensor having a plurality of optical imaging elements arranged in a linear array and being activated to produce an analog output signal indicative of the width of the bar symbols by reflected light received from the plurality of parallel bar symbols, the plurality of parallel bar symbols being illuminated by ambient light only and not by a light source associated with the bar code scanner;

clock generator means for generating clocking signals at a predetermined frequency and for applying said clocking signals to said image sensor to enable optical reading of the bar symbols;

means for filtering said analog output signal to thereby filter clock noise associated with said clocking signals from said analog output signal and for generating a filtered signal;

means for increasing the amplitude of said filtered signal above a predetermined frequency;

means for automatically controlling the amplitude of said filtered signal and for generating a normalized analog signal; and

means for converting said normalized analog signal to a digital signal indicative of the width of the bar symbols.

4,874,934

IC CARD WHICH DISPLAYS EMBOSSED INFORMATION TO PREVENT COUNTERFEITING

Jirou Nakahara, Fujisawa; Akito Ueshin, Yokohama, and Shiro Okajima, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

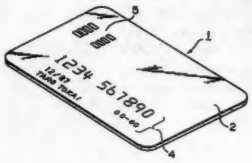
Filed Jun. 24, 1987, Ser. No. 66,021
Claims priority, application Japan, Jun. 28, 1986, 61-152160
Int. Cl.[4] G06K *19/06*
U.S. Cl. 235—492 **13 Claims**

1. An IC card having predetermined information embossed on its surface, comprising:

a display section;

storage means for storing the predetermined information; and

control means for reading out the predetermined information in response to a read instruction, and for displaying



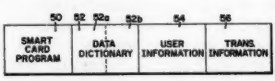
the readout predetermined information on said display section.

4,874,935

SMART CARD APPARATUS AND METHOD OF PROGRAMMING SAME

Thomas L. Younger, Minnetonka, Minn., assignor to Data Card Coprporation, Minneapolis, Minn.

Continuation of Ser. No. 838,095, Mar. 10, 1986, abandoned.
This application Oct. 5, 1988, Ser. No. 253,873
Int. Cl.[4] G06K *19/06*
U.S. Cl. 235—492 **13 Claims**



1. A method for making a smart card including a microcomputer; the method comprising the steps of:

a. programming the microcomputer with a smart card control program;

b. defining data dictionary means for defining data stored in the microcomputer; and

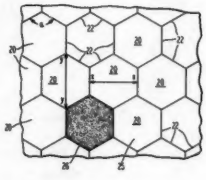
c. programming the microcomputer with the data dictionary means and personalized data.

4,874,936

HEXAGONAL, INFORMATION ENCODING ARTICLE, PROCESS AND SYSTEM

Donald G. Chandler, Pennington; Eric P. Batterman, Cherry Hill, and Govind Shah, Princeton Junction, all of N.J., assignors to United Parcel Service of America, Inc., Greenwich, Conn.

Filed Apr. 8, 1988, Ser. No. 178,600
Int. Cl.[4] G06K *19/06*
U.S. Cl. 235—494 **79 Claims**
MICROFICHE APPENDIX INCLUDED
(1 Microfiche, 78 Pages)



1. An optically readable label for storing encoded informa-

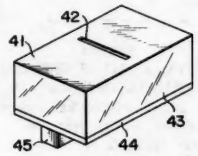
tion comprising a multiplicity of information-encoded hexagons contiguously arranged in a honeycomb pattern, each hexagon having one of at least two different optical properties.

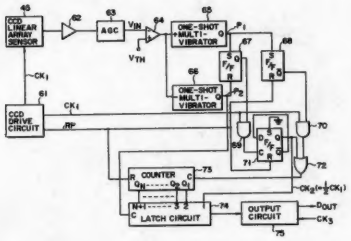
4,874,937

DIGITAL SUN SENSOR

Tsuguhiko Okamoto, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 9, 1987, Ser. No. 23,719
Claims priority, application Japan, Mar. 12, 1986, 61-54094
Int. Cl.[4] G01C *1/00*; G01B *11/26*
U.S. Cl. 250—203 R **1 Claim**





1. A digital sun sensor comprising:

first clock signal generating means for generating a first clock signal;

a linear array sensor having a light-receiving surface and a plurality of photosensing elements arranged in a line, and designed to convert light into electrical charges and to convert the electrical charges into electrical signals by the first clock signal;

an opaque layer having a slit therein extending at right angles to the line in which photosensing elements are arranged for diffracting light, thereby to apply the light onto said linear array sensor;

a prism interposed between said opaque layer and said linear array sensor;

a band-pass filter mounted on the light-receiving surface of said linear array sensor for passing light of a specified wavelength;

an automatic gain control circuit for maintaining the electrical signals supplied from said linear array sensor at a predetermined peak value;

a comparator for comparing the output signal of said automatic gain control circuit with a predetermined reference level, thereby to produce an output signal which has a first level when the output signal of said automatic gain control circuit is equal to or higher than said reference level and has a second level when the output signal of said automatic gain control circuit is lower than the reference level;

first timing pulse generating means for generating a first timing pulse when the output signal of said comparator changes from the second level to the first level;

second timing pulse generating means for generating a second timing pulse when the output signal of said comparator changes from the first level to the second level;

reset signal generating means for generating a reset signal before an electrical signal of the first photosensing element of said linear array sensor driven by the first clock signal is transferred to said automatic gain control circuit;

first control signal generating means for continuously generating a first control signal upon receiving the reset signal from the reset signal generating means until the first timing pulse from said first timing pulse generating means has been received;

second control signal generating means for continuously generating a second control signal upon receiving the first timing pulse from said first timing pulse generating means until the second timing pulse from said second timing pulse generating means has been received;

second clock generating means for generating a second clock signal having a frequency half that of the first clock signal by dividing the frequency of the first clock signal when it receives the second control signal from said second control signal generating means;

clock selecting means for selecting the first clocksignal from said first clock generating means when it receives first control signal from said first control signal generating means and selecting the second clock signal from said second clock generating means when it receives the second control signal from said second control signal generating means;

a counter having N bit-output terminals, where N is defined as an integer, for counting the pulses of the first and second clock signals selected by said clock selecting means, the counted value being cleared to "0" by the reset signal; and

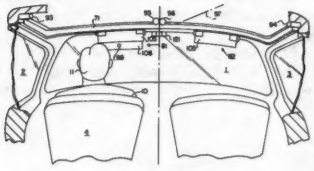
a latch circuit having (N+1) bit-input terminals, for receiving a pulse of said second clock signal at the lowest bit-input terminal, receiving the N output bits from said counter at the other bit-input terminals, and latching each bit input when it receives the second timing pulse from said second timing pulse generating means.

4,874,938

AUTOMATIC MOTOR VEHICLE VISOR SYSTEM

Cliff Chuang, Lowell, Mass., assignor to Prospects Corp., Lowell, Mass.

Filed Mar. 16, 1988, Ser. No. 168,674
Int. Cl.[4] G01J *1/20*
U.S. Cl. 250—203 R **20 Claims**



1. In a motor vehicle having a windshield and a driver's station for viewing outside the vehicle through the windshield, an automatic electrically energized sun blocking system comprising,

(a) means for detecting the direction of the sun and producing signals representative of said direction,

(b) one or more sunlight blocking visors located immediately at or adjacent said windshield,

(c) means for movably supporting said visor

(d) means for changing the position of said sun light blocking visor and

(e) means in electrical circuit with said detecting means and said means for changing position of said sun light blocking

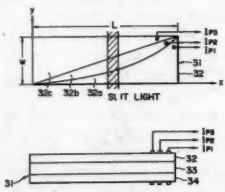
visor for changing the position of said sunlight blocking visor to block sunlight from the eyes said driver.

4,874,939

METHOD AND APPARATUS FOR DETECTING POSITION/VARIANCE OF INPUT LIGHT USING LINEAR AND QUADRATIC OUTPUTS

Yoshiro Nishimoto; Yasuji Yoneda; Shinichi Imaoka; Yasuhide Nakai; Akimitsu Nakane; Yoshihiko Onishi; Hiroyuki Tachibana; Takayoshi Inoue, all of Kobe; Takuya Kusaka, Urawa; Hiroyuki Takamatsu, Kobe; Shigeki Tojyo, Osaka; Hiroshi Kajikawa, and Kozo Nishimura, both of Kobe, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Sep. 25, 1987, Ser. No. 101,170
Claims priority, application Japan, Sep. 25, 1986, 61-224985
Int. Cl.[4] H01J *40/14*
U.S. Cl. 250—211 J 9 Claims



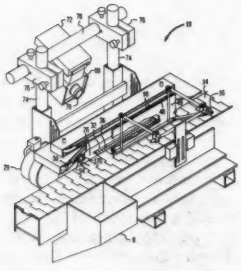
1. A method for detecting position/variance of input light using a photoelectric conversion device receiving input light comprising the steps of taking out a linear output proportional to an average of the distances between one end of said photoelectric conversion device and positions of the input light and a quadratic output proportional to an average of the squares of the distances between one end of said photoelectric conversion device and the positions of the input light, detecting the same as the position of said input light based on the linear output and, based on the linear output and the quadratic output, calculating to detect variance of said input light.

4,874,940

METHOD AND APPARATUS FOR INSPECTION OF A TRANSPARENT CONTAINER

James H. McMeekin, Brockway; Alan E. Lerch; Ronald S. Chollock, both of DuBois, and James F. Wesdock, Reynoldsville, all of Pa., assignors to Brockway, Inc. (N.Y.), Jacksonville, Fla.

Filed Jan. 11, 1988, Ser. No. 141,844
Int. Cl.[4] G01N *9/04;* G06M *7/00;* H01J *40/14*
U.S. Cl. 250—223 B 40 Claims



1. A method for inspecting a transparent container, said container having a bottom and a side wall, comprising the steps of:

focusing light from a light source into a line of light that extends along the length of the bottom of at least one container to be inspected, said focused light entering said container through the exterior surface of said container bottom,

detecting the intensity of the light passing through said container side wall, after said focused light has passed through said container bottom and been reflected at least at one predetermined angle, and

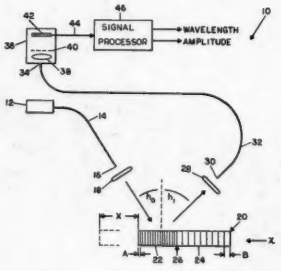
comparing the detected intensity of said reflected light with a predetermined threshold value, said predetermined threshold value providing a measure of the acceptability of said container.

4,874,941

OPTICAL DISPLACEMENT SENSOR WITH A MULTI-PERIOD GRATING

William B. Spillman Jr., Charlotte, Vt., assignor to Simmonds Precision Products, Inc., Wilmington, Del.

Filed May 11, 1988, Ser. No. 192,716
Int. Cl.[4] H01J *3/14*
U.S. Cl. 250—237 G 10 Claims



1. An optical displacement sensor, comprising:

a diffraction grating having a first grating period and a different second grating period;

means for irradiating said diffraction grating at a predetermined angle with broadband optical radiation;

means for detecting a change in a characteristic of the light diffracted from said diffraction grating as a consequence of irradiation of the boundary between the first and second gratings as the boundary is displaced relative the irradiating light, said detecting means having a second optical fiber having an input end and an output end;

means for focusing the diffracted light into said input end of said second optical fiber; and

means coupled to said output end of said second optical fiber for determining at least the wavelength of the diffracted light.

4,874,942

ROTATION, ACCELERATION, AND GRAVITY SENSORS USING QUANTUM-MECHANICAL MATTER-WAVE INTERFEROMETRY WITH NEUTRAL ATOMS AND MOLECULES

John F. Clauser, 975 Murrieta Blvd. #22, Livermore, Calif. 94550

Filed Oct. 26, 1987, Ser. No. 113,620
Int. Cl.[4] H05H *3/00;* G01P *15/00*
U.S. Cl. 250—251 30 Claims

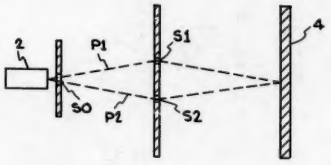
1. Apparatus for simultaneously measuring and distinguishing between rotation and acceleration plus gravity, comprising a plurality of neutral particle matter-wave interferometers, each comprising

a means for producing neutral particles selected from atoms and molecules,

propagation path defining means which form a plurality of positionally separated paths, along which the particles and their associated matter waves propagate,

a region where the quantum-mechanical matter-waves associated with the particles interfere,

a means for detecting the interference between the matter waves,



and further, in which one of the interferometers propagates neutral particles, further selected from

particles with a mass that is different from the particle mass propagating in at least one of the other interferometers, and

particles with a kinetic energy that is different from the particle kinetic energy propagating in at least one of the other interferometers.

4,874,943

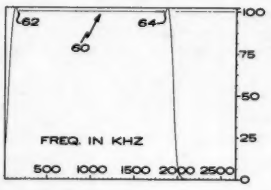
MASS SPECTROMETER ION EXCITATION SYSTEM

Robert B. Spencer, Madison, Wis., assignor to Nicolet Instrument Corporation, Madison, Wis.

Filed Jan. 28, 1985, Ser. No. 695,847

Int. Cl.[4] H01J *49/36*

U.S. Cl. 250—281 **36 Claims**



1. In an ion cyclotron resonance mass spectrometer of the type having means for trapping gaseous ions within an analyzer cell, means for exciting the ions into resonance, and means for detecting the ions, the improvement wherein the means for exciting the ions comprises:

means for producing a swept radio-frequency field having a generally constant-amplitude power spectrum over a range of frequencies of interest and causing the field to have an envelope having an onset region which gradually varies from a first level to a second level.

4,874,944

MASS SPECTROMETER

Yoshiaki Kato, Mito, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

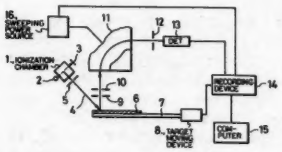
PCT No. PCT/JP87/00434, § 371 Date Jan. 13, 1988, § 102(e) Date Jan. 13, 1988, PCT Pub. No. WO87/01452, PCT Pub. Date Mar. 12, 1987

PCT Filed Jun. 26, 1987, Ser. No. 149,223

Claims priority, application Japan, Jul. 4, 1986, 61-156056

Int. Cl.[4] B01D *59/44*

U.S. Cl. 250—288 **8 Claims**



1. A mass spectrometer comprising:

means for generating a primary beam so that said primary beams is directed to a first predetermined position;

means for holding a target carrying sample components;

means for moving said target so that said sample components are situated at said first predetermined position;

means for mass-dispersing ions that are generated by bombarding said sample components with said primary beam when said sample components are situated at said first predetermined position;

means for effecting mass number sweeping so that the mass-dispersed ions having various mass numbers are passed through a second predetermined position;

means for detecting the ions passing through said second predetermined position; and

means for controlling said target moving means in such a manner as to stop said target when each of said sample components are situated at said first predetermined position and for controlling said mass number sweeping effecting means in such a manner so as to effect said mass number sweeping during the stoppage of said target and to start said mass number sweeping after the passage of a predetermined period from the stop of said target till the quantity of ions generated from said sample components are substantially stabilized.

4,874,945

ELECTRON MICROSCOPE EQUIPPED WITH SCANNING TUNNELING MICROSCOPE

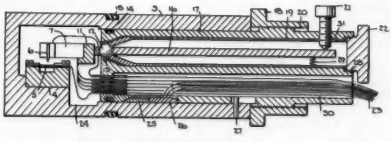
Kimio Ohi, Tokyo, Japan, assignor to Jeol Ltd., Tokyo, Japan

Filed Oct. 21, 1988, Ser. No. 260,525

Claims priority, application Japan, Oct. 23, 1987, 62-267880

Int. Cl.[4] H01J *37/00*

U.S. Cl. 250—306 **4 Claims**



1. An apparatus for observing a surface of a sample, said apparatus comprising:

a transmission electron microscope comprising an objective lens, said lens comprising an upper pole piece and a lower pole piece;

a holder disposed between the upper pole piece and the lower pole piece, and the sample being secured inside the holder;

a scanning tunneling microscope comprising a scanner and a probe tip, the scanner being mounted inside the holder; and

a shift mechanism arranged and constructed to move the scanner inside the holder in two directions parallel to the surface of the sample and in a direction perpendicular to the surface of the sample.

4,874,946

METHOD AND APPARATUS FOR ANALYZING THE INTERNAL CHEMISTRY AND COMPOSITIONAL VARIATIONS OF MATERIALS AND DEVICES

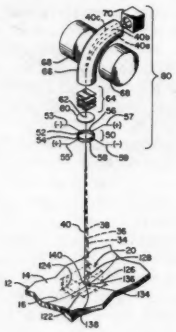
Lawrence L. Kazmerski, Lakewood, Colo., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 30, 1985, Ser. No. 728,970

The portion of the term of this patent subsequent to Nov. 17, 2004, has been disclaimed.

Int. Cl.[4] H01J *37/252*; G01N *23/225*

U.S. Cl. 250—309 **19 Claims**



13. Apparatus for determining and analyzing the chemical and compositional structure of solid devices, comprising:

sputtering means for eroding the material composition from a selected volume of the device;

secondary ion mass spectrometer means for determining the chemical types and concentrations of various materials eroded from various selected points in the volume, said secondary ion mass spectrometer means including collection means positioned adjacent the eroding surface of the selected volume for collecting and routing into said secondary ion mass spectrometer means the materials sputtered from any selected point on an exposed surface of said volume for determination by secondary ion mass spectrometry of the chemical type and concentration of the materials sputtered from the selected point;

raster means connected to said collection means for selecting sequential points of collection by rastering the collection means in selected increments of space and time over the exposed surface of the volume simultaneously with operation of the sputtering means;

recording means for recording the types and concentrations of the various materials removed from the selected points in conjunction with the location of each of such points; and

display means for displaying simultaneously the types and concentrations of the various materials removed from selected combinations of points in the volume.

4,874,947

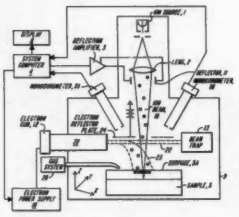
FOCUSED ION BEAM IMAGING AND PROCESS CONTROL

Billy W. Ward, Rockport, and Michael L. Ward, Gloucester, both of Mass., assignors to Micrion Corporation, Beverly, Mass.

Filed Feb. 26, 1988, Ser. No. 160,578

Int. Cl.[4] H01J *37/304*

U.S. Cl. 250—309 **22 Claims**



1. Ion beam machining apparatus comprising

A. ion beam source means for directing a fine-focus ion beam onto an impingement site on a target for sputtering particles from the target, said ion beam defining an axis of incidence onto the target, said axis of incidence defining a Z-coordinate axis,

B. electron source means for projecting a stream of electrons onto the target for neutralizing charge produced on the said ion beam relative to the target and maintain a selected sub-micron positional accuracy of said ion beam relative to the target, said electron source means having means for reducing emission of light energy, from said electron source means, which can impinge upon said photon detector means,

C. photon detector means for detecting photons emitted in response to incidence of said ion beam on the target, and for generating photon detector signals representative of selected emission characteristics of said emitted photons,

D. output means in electrical circuit with said photon detector means for detecting, in response to said photon detector signals, transitions between different material constituents within the target, and for identifying, in response to detected transitions between different material constituents within the target, a Z axis coordinate of the impingement site of said ion beam within the target,

E. scanner means for selectively deflecting the position of the impingement site on the target, along a raster pattern, said raster pattern defining an X-Y plane substantially perpendicular to said Z axis, and

F. means in electrical circuit with said scanner means for generating position signals representative of X-Y coordinates of the impingement site relative to said X-Y plane.

4,874,948

METHOD AND APPARATUS FOR EVALUATING THE DEGREE OF CURE IN POLYMERIC COMPOSITES

Paolo Cielo, Montreal; Jean-Claude Krapez, Longueuil; Kenneth C. Cole, St-Hubert, and Ghislain Vaudreuil, Boucherville, all of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Dec. 28, 1987, Ser. No. 138,072

Claims priority, application Canada, Dec. 29, 1986, 526374

Int. Cl.[4] G01N *21/00*

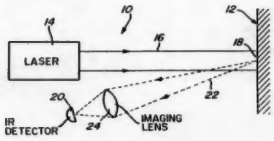
U.S. Cl. 250—341 **63 Claims**

1. A method of evaluating the degree of cure in a polymeric composite, which comprises the steps of:

(a) heating a surface portion of the polymeric composite to substantially curing temperature, over a predetermined period of time;

(b) continously monitoring with a non-contact temperature

sensing means temperature fluctuations of the heated surface portion during said predetermined period of time to obtain data comprising surface temperature values measured as a function of time; and



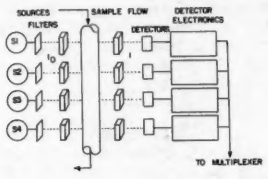
(c) processing the data obtained in step (b) including comparing with a calibration reference to obtain an evaluation of the degree of cure of said polymeric composite.

4,874,949

METHOD OF MEASURING LUNG VASCULAR FUNCTION AND TRANSCAPILLARY TRANSPORT BY THE USE OF NONRADIOACTIVE MARKERS

Thomas R. Harris, and Robert L. Galloway, Jr., both of Nashville, Tenn., assignors to Vanderbilt University, Nashville, Tenn.

Filed Sep. 14, 1987, Ser. No. 96,856
Int. Cl.[4] G01N *21/35*
U.S. Cl. 250—343 **8 Claims**



1. An indicator dilution method for measuring lung vascular function, said method comprising:

injecting an indicator mixture which comprises 1, 2 propanediol into the circulatory system so that the mixture becomes diluted with blood,

withdrawing a sample of arterial blood,

measuring the transmittance of filtered light through the blood.

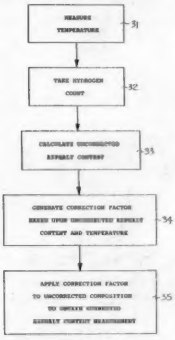
4,874,950

ASPHALT CONTENT GAUGE WITH COMPENSATION FOR SAMPLE TEMPERATURE DEVIATIONS

Ali Regimand, Raleigh, N.C., assignor to Troxler Electronic Laboratories, Inc., Research Triangle Park, N.C.

Filed Mar. 30, 1988, Ser. No. 175,144
Int. Cl.[4] G01N *23/05*
U.S. Cl. 250—390.04 **7 Claims**

1. An improvement in the method of determining the hydrogen content of a hydrogen-containing material wherein a sample of the material is subjected to a fast neutron source and neutrons which are thermalized by the presence of hydrogen in the material are detected to thus obtain a measurement of the hydrogen content of the material, said improvement comprising compensating for the inaccuracy due to variations in the temperature of the sample by applying to the measurement a



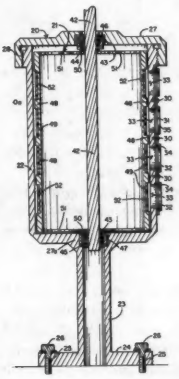
correction factor which is a function of both the temperature of the sample and the hydrogen content of the sample.

4,874,951

SOLID-STATE TRACK RECORDER DOSIMETRY DEVICE TO MEASURE ABSOLUTE REACTION RATES AND NEUTRON FLUENCE AS A FUNCTION OF TIME

Raymond Gold, and James H. Roberts, both of 1393 George Washington Way, Suite No. 7, P.O. Box 944, Richland, Wash. 99352

Filed Jul. 13, 1987, Ser. No. 72,776
Int. Cl.[4] G01T *5/00, 1/02*
U.S. Cl. 250—472.1 **18 Claims**



1. A radiation dosimeter apparatus, to determine especially time dependent intensity and energy spectrum of neutron burst radiation, comprising in combination:

a first housing member rotatable relative to a second recording member said first member housing at least one means, including at least one opening, enabling radiation to enter through the said first member from a source exterior thereof, and

a second relatively rotatable recording member mounted adjacent said first member, said second member having means for accepting solid state track recording material in rotatable alignment with said opening in the first member, and

means for rotating said first and second members relative

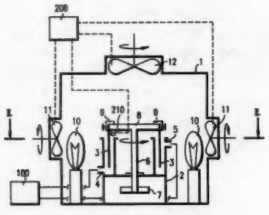
each other at a predetermined angular velocity such that radiation entering through the openings in the first member impinges on said solid state track recording material carried by the second members to sense radiation in a qualitative fashion and in a time oriented manner.

4,874,952

DEVICE FOR ACCELERATED PHOTO-AGING OF MATERIALS CONTAINING POLYMERS

Rene Arnaud, Clermont-Ferrand; Jean-Luc Gardette, Aubiere, and Jacques Lamaire, Beaumont, all of France, assignors to Universite De Clermont II, Laboratoire De Photochimie, Aubiere, France

Filed Apr. 28, 1988, Ser. No. 187,367
Claims priority, application France, Apr. 28, 1987, 87 06216
Int. Cl.[4] G01N *17/00*
U.S. Cl. 250—455.1 **12 Claims**



1. A device for the accelerated photo-aging of materials containing polymers, for enabling samples of said materials to be submitted to the simultaneous action of ultraviolet radiation, temperature and oxygen in an aqueous or gaseous phase, with a view toward analyzing and interpreting the phenomena of photodegradation, comprising:

(a) an external enclosure having a vertical axis of symmetry,

(b) at least four sources of ultraviolet radiation evenly distributed about said axis of symmetry in said external enclosure for emitting beams of radiation in a selected wavelength range,

(c) a vat defining an annular space and having at least one cylindrical wall which is transparent to radiation having a wavelength at least equal to 295±5 nm and which is coaxial with the external enclosure, (p1) (d) means for circulating a liquid aqueous phase within said vat,

(e) a sample holder arranged coaxial with said transparent cylindrical wall and including means for holding a sample immersed in the liquid aqueous phase within said vat,

(f) means for rotating said sample holder around said axis of symmetry, wherein said sample rotates in the liquid aqueous phase,

(g) means for regulating the temperature of the aqueous phase,

(h) means providing oxygen saturation of the circulating aqueous phase,

(i) means for circulating a gaseous phase inside the external enclosure, and

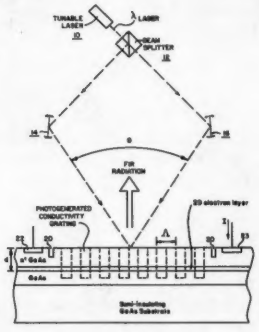
(j) means for regulating the means for circulating the gaseous phase such that the temperature of the exposed samples is regulated.

4,874,953

METHOD FOR GENERATION OF TUNABLE FAR INFRARED RADIATION FROM TWO-DIMENSIONAL PLASMONS

Joseph Katz, Pasadena, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Filed Oct. 6, 1988, Ser. No. 254,141
Int. Cl.[4] H01S *3/19*
U.S. Cl. 250—493.1 **10 Claims**



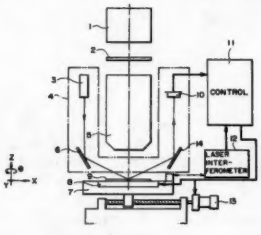
1. A method for generating far infrared radiation from two-dimensional plasmons in an inversion layer of electrons of a semiconductor device without a metallic grating comprising the steps of producing two coherent beams of radiation at the same wavelength selected for the radiation to be strongly absorbed by said semiconductor device, and directing said coherent beams onto a surface of said semiconductor device parallel to said inversion layer at an angle with respect to each other to produce an interference pattern that generates a photoconductivity grating penetrating through said inversion layer of electrons, thereby to couple out a beam of far infrared radiation through said surface.

4,874,954

PROJECTION EXPOSURE APPARATUS

Kazuo Takahashi, and Hiroyoshi Kubo, both of Kawasaki, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 151,308, Feb. 1, 1988, abandoned. This application Mar. 1, 1989, Ser. No. 319,877
Claims priority, application Japan, Feb. 2, 1987, 62-023159; Apr. 21, 1987, 62-096320
Int. Cl.[4] G01N *21/80*
U.S. Cl. 250—548 **21 Claims**



1. An exposure apparatus, comprising:

an imaging optical system usable to project, in sequence, images of a pattern including chip patterns an original upon different regions of a workpiece, said imaging optical system having an optical axis;

detecting means operable to irradiate, with a light, a prede-

termined portion of a first region of the workpiece to detect the position of said first portion with respect to a direction of said optical axis of said imaging optical system;

a workpiece carrying stage for carrying thereon the workpiece and being movable in a plane perpendicular to said optical axis, said workpiece carrying stage being movable to allow detection of the position of said first region with respect to the direction of said optical axis by said detecting means and the projection of the image of the pattern upon said first region by said imaging optical system;

aligning means operable, in accordance with the detection by said detecting means, to bring the position of said first region with respect to the direction of said optical axis into coincidence with the image of the pattern projected by said imaging optical system; and

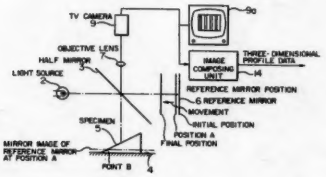
correcting means operable, in accordance with the position of a second region of a workpiece with respect to the surface of the workpiece, to move said workpiece carrying stage to a position which is different from a position at which the image of the pattern of the original can be projected upon said second region, such that at said different position of said workpiece carrying stage the position of said second region with respect to the direction of said optical axis is detected by said detecting means.

4,874,955

METHOD AND APPARATUS FOR MEASURING A THREE-DIMENSIONAL CURVED SURFACE SHAPE

Mitsuaki Uesugi; Masaichi Inomata, and Isamu Komine, all of Kanagawa, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Oct. 17, 1988, Ser. No. 258,603
Claims priority, application Japan, May 17, 1988, 63-118201
Int. Cl.[4] G02B *27/42*
U.S. Cl. 250—550 **5 Claims**



1. A method of measuring a three-dimensional curved surface shape comprising the steps of:

producing interference fringes on a surface of an object to be measured in accordance with a difference in optical path length between the surface of said object to be measured and a reference plane;

measuring a position of said reference plane or of a reference surface of said object to be measured in the direction of an optical path or a quantity equivalent to said position while moving said reference plane or said object in said optical axis direction;

picking up a pattern of said interference fringes produced on the surface of said object to be measured;

processing from moment to moment a video signal generated by picking up the surface of said object to be measured to form a composite image in which a value of each of picture elements is represented by a position of said reference plane or said object reference surface in said optical axis direction or a quantity equivalent thereto at an instant that one of positions on said object surface corresponding to each said picture element attains a maximum brightness; and

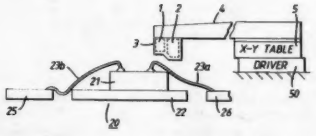
measuring a three-dimensional curved surface shape of said object to be measured in accordance with said composite image.

4,874,956

METHOD AND APPARATUS FOR INSPECTING SEMICONDUCTOR DEVICES FOR THEIR BONDING STATUS

Toshihiro Kato, Chigasaki; Masamichi Shindo, and Yoshihito Fukasawa, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 4, 1988, Ser. No. 177,412
Claims priority, application Japan, Apr. 14, 1987, 62-89713
Int. Cl.[4] G01N *21/86*
U.S. Cl. 250—560 **11 Claims**



1. An apparatus for inspecting the bonding status of semiconductor device comprising;

stage means for supporting the semiconductor device;

light source means for generating a focused light beam;

scanning means for scanning the focused light beam on the semiconductor device;

detecting means for sensing the light reflected from the semiconductor device, and producing detected output signals corresponding to the distance between the reflection point of the focused light beam and the light source means;

critical level signal generating means for generating a predetermined critical level signal having a value such that a detected output signal less than said critical level signal will only be generated by a defectively bonded semiconductor device; and

comparing means for comparing the level of the detected output signals with said predetermined critical level signal,

whereby differences between said detected output signals and ideal output signals which are indicative of defective bonding in a defective semiconductor device may be distinguished from the differences which are not indicative of a defective semiconductor device.

4,874,957

CONTACT TYPE IMAGE SENSOR

Saburo Sasaki, Sendai; Tsutomu Ishida, Machida, and Kenji Yamamoto, Miyagi, all of Japan, assignors to Ricoh Company, Ltd., Tokyo and Ricoh Research Institute of General Electronics, Natori, both of, Japan

Filed Sep. 27, 1988, Ser. No. 249,673
Claims priority, application Japan, Oct. 2, 1987, 62-250426
Int. Cl.[4] H01J *40/14*
U.S. Cl. 250—578 **12 Claims**

1. A contact type image sensor comprising:

a transparent insulating substrate;

a plurality of opaque metallic films formed on top of the transparent insulating substrate;

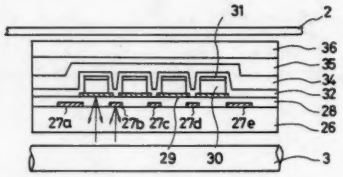
a transparent insulating film formed so as to cover the plurality of opaque metallic films;

a plurality of lower electrodes formed on top of the transparent insulating film, each having a light window, each opaque metallic film being located between adjacent lower electrodes so as to prevent light emitted from a light source from being irradiated on a document to be scanned;

a plurality of photoelectric conversion layers formed on the lower electrodes;

a plurality of transparent conductive films each formed on top of the corresponding photoelectric conversion layer;

transparent interlayer insulating film formed so as to cover the plurality of photoelectric conversion layers, the transparent interlayer insulating film having through holes for establishing connections with the transparent conductive films; and



a plurality of upper extension electrodes each connected to the corresponding transparent conductive film through the through hole, each opaque metallic film being located between adjacent upper extension electrodes so as to prevent the light from being irradiated on the document,

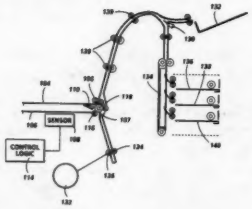
wherein only light which is emitted from the light source and then passes through the light window, is irradiated on the document.

4,874,958

SHEET EDGE DETECTOR

Barbara A. Sampath, Fairport, and Richard C. Schenk, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 4, 1988, Ser. No. 253,151
Int. Cl.[4] G03G *15/00*
U.S. Cl. 355—309 **17 Claims**



1. An apparatus for determining the location of an edge of a sheet, including:

means for advancing the sheet; and

means for distinguishing between the edge of the sheet and a hole in the marginal region thereof.

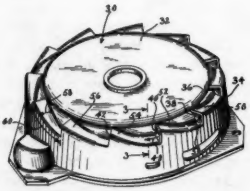
4,874,959

MARINE ENGINE WITH LOUVERED FLYWHEEL COVER SHROUD

Stephen E. Sheridan, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Apr. 1, 1988, Ser. No. 176,608
Int. Cl.[4] H02K *5/20*
U.S. Cl. 290—1 B **7 Claims**

1. In a two cycle internal combustion marine engine having a vertical crankshaft extending upwardly through a crankcase and alternator, and a flywheel secured to the top of the crankshaft, a flywheel cover shroud comprising an inverted dish-like member over said flywheel and said alternator, said cover shroud having one or more vents therein exhausting air, to cool said alternator, wherein said cover shroud has a top wall and an extending side wall, and said vents are formed by one or more openings in said cover shroud along an upper perimeter thereof, and said side wall is generally cylindrical and extends downwardly from the outer perimeter of said top wall, and wherein said openings are formed at the top of said side wall at the interface with said top wall, and wherein each of said



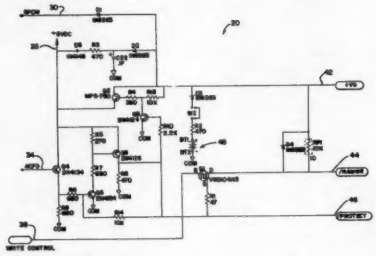
openings has a width and a height extending in a vertical plane which extends radially from said crankshaft, such that air flowing circumferentially along an arc within said cover shroud exits said cover shroud through said opening by flowing along a horizontal arcuate direction perpendicular to said vertical radial plane of said opening.

4,874,960

PROGRAMMABLE CONTROLLER CAPACITOR AND BATTERY BACKED RAM MEMORY BOARD

Jeffrey J. Cybela, Glendale, Wis., assignor to Square D Company, Palatine, Ill.

Filed Mar. 4, 1988, Ser. No. 164,148
Int. Cl.[4] H02J *9/02*; G11C *11/34*
U.S. Cl. 307—64 **8 Claims**



1. A switching network for a programmable controller carried on a removable card assembly including memory components that receive power on a power lead, said card assembly including a source lead adapted to be connected to a line source of electrical power that is subject to failure, said electrical power occurring at a certain voltage, said network transmitting electrical power to said power lead, said switching network comprising:

a switch connected between said source lead and said power lead, said switch being normally closed to conduct electrical power from said source lead to said power lead and becoming open upon at least partial loss of said certain voltage of said line source electrical power;

capacitance means having high capacity and normally receiving electrical charge at the voltage of said line source power supply from said source lead, and supplying electrical power to said power lead upon the voltage at said power lead falling below said certain voltage due to at least a temporary fai¹ure in said line source power supply; and

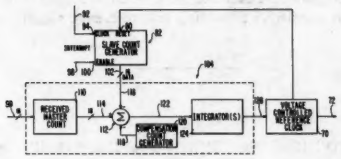
first battery means having a first voltage substantially less than said certain voltage of said line source electrical power supply, said first battery means being connected to said power lead and supplying power to said power lead upon the voltage on said power lead falling substantially to said first voltage.

4,874,961

ELECTRICAL POWER GENERATING SYSTEM HAVING PARALLEL GENERATOR CONTROL

Eric A. Henderson, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Oct. 31, 1988, Ser. No. 264,886
Int. Cl.[4] H02J 1/10
U.S. Cl. 307—87 51 Claims



1. An alternating current generating system having at least one slave generator with each slave generator being controlled by an associated slave generator control unit with alternating current generated by each slave generator being at least locked in phase to alternating current generated by a master generator controlled by a master generator control unit wherein:

the master generator control unit includes a master count generator for generating a synchronization count varying from a minimum to a maximum during each cycle of the alternating current generated by the master generator with the synchronization count being proportional at any time during a cycle of the alternating current to a phase of electrical current being generated by the master generator with respect to a time reference;

each of the slave generator control units includes a slave count generator, each slave count generator generating a synchronization count varying from the minimum to the maximum during each cycle of the alternating current generated by the slave generator controlled by the slave generator control unit with the synchronization count of each slave count generator at any time during a cycle of alternating current generated by the slave generator controlled by the slave generator control unit being proportional to a phase of the generated alternating current measured with respect to a time reference;

a transmission system is coupled to the master generator control unit and each of the slave generator control units for periodically transmitting the synchronization count from the master count generator to each slave generator control unit;

each slave generator control unit has a processor for generating a correction count which is a function of a difference between the synchronization count received from the master control unit and the synchronization count of the slave count generator; and

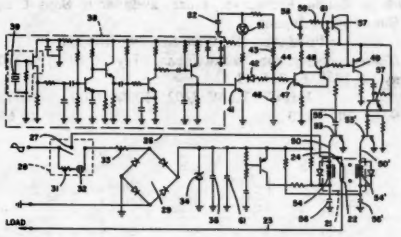
each slave generator control unit has a controller for adjusting at least the phase of the alternating current generated by the slave generator controlled by the slave generator control unit as a function of the correction count.

4,874,962

LOW POWER, LEAKAGE CURRENT SWITCHING CIRCUIT

Albert L. Hermans, 2555 Nicholson St., San Leandro, Calif. 94577

Filed May 21, 1987, Ser. No. 52,482
Int. Cl.[4] H01H 47/12
U.S. Cl. 307—116 21 Claims



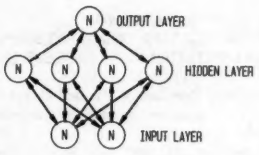
1. A low power switching circuit for delivering AC electrical power to a load from a AC power supply having a hot leg, a neutral leg and earth ground connections, including full wave rectifier means connected between the hot leg and the earth ground connection, current limiting means connected between the hot leg and said rectifier means to restrict current flow to said rectifier means to less than 500 microamps, relay means having normally open contacts, means for connecting one of said normally open contacts to the hot leg and the other of said normally open contacts to said load, transistor switching circuit means for operating said relay means in response to an actuating signal, said transistor switching circuit and said relay means being connected to said rectifier means and driven solely by the direct current therefrom, and sensor means for generating said actuating signal in response to human presence proximate to said low power switching circuit.

4,874,963

NEUROMORPHIC LEARNING NETWORKS

Joshua Alspector, Westfield, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.

Filed Feb. 11, 1988, Ser. No. 155,150
Int. Cl.[4] G06G 7/12
U.S. Cl. 307—201 12 Claims



1. A neuron network comprising interconnected input, hidden and output layers of neurons, said neurons comprising "on-off" or threshold electronic devices,

all of said neurons which are connected being symmetrically connected by means of automatically-adjustable synapse pairs, each of said synapses comprises a plurality of drain-source circuits of field effect transistors, said source-drain circuits having resistances or conductances which differ from each other by ratios of 2 to 1,

whereby different combinations of said source-drain circuits can be switched in parallel to provide any resistance or conductance, in a binary sequence, for each of said synap-

ses, said synapses being controlled by the output of an Up-Down counter, and

means to control the reading of said counter depending on the results of a correlation of the states of each connected pair of said neurons following the application of sets of training signals to said neurons network.

4,874,964

CURRENT GENERATING CIRCUIT

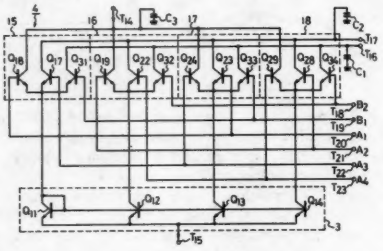
Tetsuya Kondo, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 20, 1988, Ser. No. 184,126

Claims priority, application Japan, May 28, 1987, 62-132398; May 29, 1987, 62-135529

Int. Cl.[4] H03K *3/02;* H03M *1/00*

U.S. Cl. 307—270 10 Claims



1. A current generating circuit for generating a plurality of currents accurately in a predetermined integer ratio, comprising:

(a) a current dividing circuit for dividing an input current into 2^n (n is a positive integer) output currents;

(b) a current change-over circuit for switching respective output currents from said current dividing circuit in a predetermined ratio and providing an output current in response to a predetermined number of clock signals in one cyclic period fed to input terminals of said change-over circuit; and

(c) a plurality of current synthesizing circuits for synthesizing output currents from said current dividing circuits and generating a corresponding plurality of output currents in the predetermined ratio in response to a predetermined number of current synthesizing signals in said one cyclic period.

4,874,965

CIRCUITAL DEVICE FOR THE POWER-ON RESET OF DIGITAL INTEGRATED CIRCUITS IN MOS TECHNOLOGY

Giovanni Campardo, Bergamo, Italy, and David Novosel, New Wilmington, Pa., assignors to SGS Microelettronica S.p.A., Catania, Italy

Filed Nov. 25, 1987, Ser. No. 125,344

Int. Cl.[4] G11C *11/00;* H03K *3/01*

U.S. Cl. 307—272.3 6 Claims

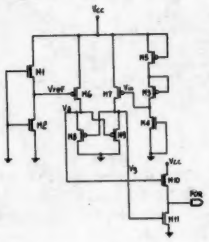
1. A power-on reset circuit for providing a reset pulse when the supply voltage rises above a preset threshold, said circuit comprising:

(a) a reference voltage generator connected between the supply voltage and the ground, supplying a reference signal having a constant preset value when the supply voltage is higher than the preset threshold;

(b) a supply follower providing an input signal which follows the supply voltage with a preset reduction factor;

(c) a bistable comparator having a first input driven by said reference signal and a second input driven by said input signal and switching from a first initially assumed state to a second state when the input signal exceeds the reference signal;

wherein said reference voltage generator



comprises two depletion transistors coupled in series between the supply voltage and the ground, each having their gate connected to the ground, the node between said two transistors providing said reference signal.

4,874,966

MULTIVIBRATOR CIRCUIT HAVING COMPENSATED DELAY TIME

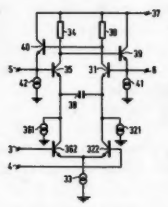
Heinz H. Gehrt; Günter Hildebrandt, both of Hamburg, and Karl-Heinz Rehfeldt, Ellerbek, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 22, 1988, Ser. No. 146,889

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1987, 3702854; Feb. 27, 1987, 3706319

Int. Cl.[4] H03K *3/281, 5/13*

U.S. Cl. 307—291 9 Claims



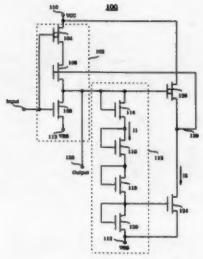
1. A multivibrator comprising:

first and a second current branch, each of which comprises a series arrangement of a resistance, a main current path of a main transistor and a controllable current source, a first connection node between the main transistor main current path and the controllable current source of the first branch being coupled via a capacitance to another first connection node between the main current path of the main transistor and the controllable current source of the second branch, a control electrode of the main transistor in one current branch being coupled to a second connection node between the resistance and the main current path of the main transistor in the other current branch so that the controllable current sources are oppositewise controlled for generating alternately in each of the current branches in a first logical state a first current and in a second logical state a second current, and means connecting a respective constant current source in parallel with each controllable current source.

4,874,967
LOW POWER VOLTAGE CLAMP CIRCUIT

Peter Deane, Sunnyvale, Calif., assignor to Xicor, Inc., Milpitas, Calif.

Filed Dec. 15, 1987, Ser. No. 133,125
Int. Cl.[4] H03K *3/01*
U.S. Cl. 307—296.8 **33 Claims**



1. An improved voltage clamping circuit for clamping a voltage at a predetermined voltage, said voltage clamping circuit having a power source terminal having a supply voltage coupled thereto, an output terminal and a reference terminal, comprising:

voltage sensing and clamping means coupled between said output terminal of said voltage clamping circuit and said reference terminal for controlling the voltage appearing between said output terminal and said reference terminal, including means for developing and sensing said voltage and for clamping said voltage at a predetermined voltage;

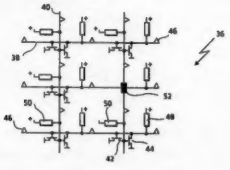
control circuit means coupled to said voltage sensing and clamping means for generating a control signal related to said voltage; and

current generating means coupled to said control circuit means and connected between said power source terminal and said voltage sensing and clamping means for generating a current responsive to said control signal, said generated current being of sufficient magnitude to produce said voltage across said voltage sensing and clamping means.

4,874,968
COMPONENT PRODUCED USING INTEGRATED TECHNOLOGY FOR THE FABRICATION OF INTEGRATED CIRCUITS

Werner Brockmann, Altenbeken, Fed. Rep. of Germany, assignor to Nixdorf Computer AG, Paderborn, Fed. Rep. of Germany

Filed Dec. 3, 1987, Ser. No. 128,392
Claims priority, application Fed. Rep. of Germany, Dec. 4, 1986, 3641452
Int. Cl.[4] H03K *3/26, 19/23, 19/094*
U.S. Cl. 307—303 **10 Claims**



1. An integrated circuit component with at least one programmable matrix type connecting field formed on a substrate and having line and column conductors forming a plurality of intersection points, and

at least some of said intersection points each having associated with it two coupling elements each connected between and associated with the line and column conductor crossing one another at the involved intersection point,

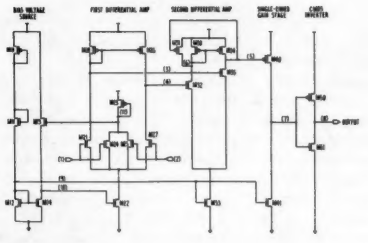
each of said two coupling elements associated with an intersection point having an initial active or inactive state and being capable of being deactivated or activated to give it a state opposite to that of its initial state,

one of said coupling elements when active serving to connect the associated line conductor to another terminal in response to signals on the associated column conductor and the other of said coupling elements when active serving to connect the associated column conductor to another terminal in response to signals on the associated line conductor.

4,874,969
HIGH SPEED CMOS COMPARATOR WITH HYSTERESIS

William H. Meadows, Arlington, Tex., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Jun. 8, 1988, Ser. No. 204,111
Int. Cl.[4] H03K *5/24*
U.S. Cl. 307—355 **3 Claims**



1. A differential gain stage comprising:

(a) a constant current source;

(b) first and second N-channel transistors having their gates connected to receive first and second input signals, respectively, and their commonly connected sources connected to the constant current source, the drain of the first N-channel transistor connected to a first output node, the drain of the second N-channel transistor connected to a second output node;

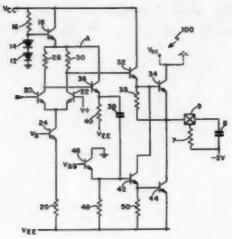
(c) a current mirror comprising a first and second P-channel transistors having their commonly-connected gates connected to the first output node and their commonly connected sources connected to a supply voltage, the drain of the first P-channel transistor connected to the first output node, the drain of the second P-channel transistor connected to the second output node; and

(d) a hysteresis element consisting of a third P-channel transistor having its gate directly connected to the second output node, its source directly connected to the supply voltage and its drain directly connected to the first output node.

4,874,970
ECL OUTPUT WITH DARLINGTON OR COMMON COLLECTOR-COMMON EMITTER DRIVE

Bruce H. Coy, and Raymond C. Yuen, both of San Diego, Calif., assignors to Applied Micro Circuits Corporation, San Diego, Calif.

Filed May 11, 1988, Ser. No. 193,261
Int. Cl.[4] H03K *19/092, 19/086*
U.S. Cl. 307—475 **9 Claims**



1. An output driver comprising:

a differential pair of transistors having a first input terminal connected to a buffer input terminal, a second input terminal connected to a first reference potential, a first output terminal for providing a first output signal, and a second output terminal for providing a second output signal logically opposite to said first output signal provided on said first output terminal;

a Darlington pair of transistors having an input terminal connected to said first output terminal of said differential pair of transistors, having an output terminal connected to an output buffer output terminal, and having an intermediate terminal connected to the emitter of the first transistor of said Darlington pair of transistors;

a first transistor having a first current handling terminal connected to a positive potential, having a control terminal connected to said second output terminal of said differential pair of transistors and having a second current handling terminal;

a first resistor having a first terminal connected to said second current handling terminal of said first transistor and having a second terminal connected to a circuit potential;

a capacitor having a first plate connected to said second current handling terminal of said first transistor and having a second plate;

a second transistor having a first current handling terminal connected to said intermediate terminal of said Darlington pair, having a control terminal connected to said second plate of said capacitor and having a second current handling terminal connected to said circuit potential; and

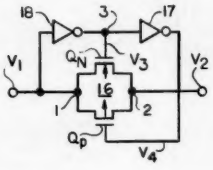
a third transistor having a first current handling terminal connected to said output terminal of said Darlington pair, having a second current handling terminal connected to said circuit potential and having a control terminal connected to said second current handling terminal of said second transistor.

7. The output circuit of claim 6, wherein said emitter follower and said output transistor are connected in a Darlington configuration.

4,874,971
EDGE-SENSITIVE DYNAMIC SWITCH

Thomas D. Fletcher, Orem, Utah, assignor to North American Philips Corporation, Signetics Division, Sunnyvale, Calif.

Continuation-in-part of Ser. No. 934,753, Nov. 25, 1986, Pat. No. 4,740,717. This application Apr. 8, 1988, Ser. No. 180,425
Int. Cl.[4] H03K *5/153*
U.S. Cl. 307—605 **11 Claims**

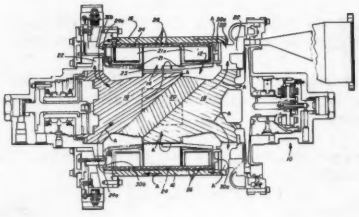


1. An electronic circuit comprising (a) a pair of complementary field-effect transistors (FET's), each having a first source/drain element, a second source/drain element, and a gate electrode, the first source/drain elements coupled together through a first node at which a first signal is present, the second source/drain elements coupled together through a second node at which a second signal is present, both of the first and second signals substantially varying between a low voltage level and a high voltage level, and (b) an inverter responsive to a third signal at a third node coupled to the gate electrode of one of the FET's for providing a substantially inverse fourth signal to the gate electrode of the other FET, characterized by delay means for causing the third signal to continually follow the first signal, either directly or inversely, by a specified time delay.

4,874,972
MAGNETIC ISOLATION AND COOLING SYSTEM IN DYNAMOELECTRIC MACHINES

Madan L. Bansal, and William A. Byrd, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 30, 1987, Ser. No. 139,638
Int. Cl.[4] H02K *9/08*
U.S. Cl. 310—57 **6 Claims**



1. In a dynamoelectric machine, an integral magnetic isolation and cooling system, comprising:

a central rotor;

a stator about the rotor;

an independent housing about the stator and fabricated of magnetically permeable material to define a flux path therethrough;

a cooling jacket about the stator between the housing and the stator, the cooling jacket having coolant passage means and being fabricated of non-magnetic material to isolate the flux path between the housing and the stator and around the cooling jacket; and

end members of non-magnetic material at opposite ends of

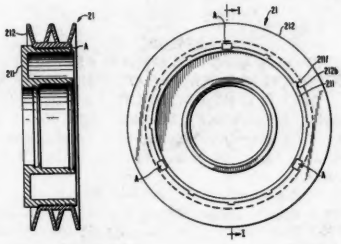
the stator to facilitate isolating the flux path between the housing and the stator.

4,874,973

METHOD AND ARRANGEMENT FOR SECURING A PULLEY TO A ROTOR IN AN ELECTROMAGNETIC CLUTCH

Takashi Matsushita, and Genzo Yanai, both of Isesaki, Japan, assignors to Sanden Corporation, Gunma, Japan

Filed Jun. 3, 1988, Ser. No. 201,904
Claims priority, application Japan, Jun. 5, 1987, 62-140081
Int. Cl.[4] H02K *7/10*; F16D *27/04*
U.S. Cl. 310—78 **11 Claims**



1. An attachment device for use in an electromagnetic clutch for attaching a pulley to an outer peripheral surface of a rotor, said device including:

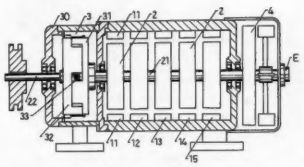
complementary engaging means respectively disposed on said rotor and said pulley for preventing relative rotational movement of said pulley and said rotor when said pulley is coupled to said rotor, said complementary engaging means comprising a plurality of axial grooves disposed on one of said rotor and said pulley and a plurality of axial projections formed on the other of said rotor and said pulley.

4,874,974

MOTOR WITH AN AUTO OUTPUT ADJUSTING DEVICE

Yao-Yu Wu, No. 181, Sec. 4, Chin - Hwa Road, Tainan, Taiwan

Filed Dec. 9, 1987, Ser. No. 130,602
Int. Cl.[4] H02K *3/00*
U.S. Cl. 310—112 **3 Claims**



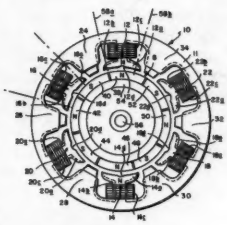
1. A motor with an auto output adjusting device, comprising a main shaft, a secondary shaft, a stator and a rotor, said stator having a plurality of independent coils with separate contact points able to drive individually the rotor by only one or more than two of said independent coils, a torque sensor connected between the main and the secondary shafts for sensing the torque the main shaft transmits to the secondary shaft, and an electric circuit responsive to the torque sensed by said torque sensor to automatically increase the number of coils which are energized after the motor is started and in response to load changes, wherein said torque sensor comprises a main and a secondary gear disc facing and engaging each other, the main gear disc being fixed on the main shaft while the secondary gear disc is fixed on the secondary shaft, a plurality of members protrude longitudinally on both the main and the secondary gear discs, spring means are set between said protruding members of the main gear disc and the secondary gear disc, the peripheral edge of the main gear disc including protrusions having an inclined surface facing the secondary gear disc, the peripheral edge of the secondary gear disc having supporters which confront said protrusion and having a hole therein, a sensing rod having one end thereof touching the inclined surface of the protrusions on the main gear disc, penetrating through the hole of the confronting supporter of the secondary gear disc having the other end thereof operatively coupled to a ring shutter and photoelectric switches operatively controlled by said ring shutter, the protrusions of the main gear disc are synchronously moved to push or release the sensing rods, which then move the ring shutter out or in the photoelectric switches in response to load changes, said electric circuit coupling said photoelectric switches to command the turning-on or turning-off of the stator independent coils in response to said load changes.

4,874,975

BRUSHLESS DC MOTOR

Friedrich R. Hertrich, Boulder, Colo., assignor to Digital Equipment Corporation, Maynard, Mass.

Continuation of Ser. No. 670,958, Nov. 13, 1984, abandoned.
This application Dec. 1, 1987, Ser. No. 127,625
Int. Cl.[4] H02K *1/10*
U.S. Cl. 310—186 **9 Claims**



1. A multiple-phase brushless DC motor comprising:

A. a field

(1) having a plurality of pairs of diametrically opposed main field poles, the number of such pairs corresponding with the number of phases of the electrical excitation of said motor.

(2) having a coil on each of said main field poles, the coils on each of said main field pole pairs being connected in series to form a coil pair, the coils of each of said coil pairs being connected so that current through the pair provides the same polarity in both of the poles of the main field pole pair,

(3) with each of said main field poles having a pole face with a generally arcuate cross section, said cross section having a centrally disposed depression extending radially away from the face,

B. an armature having

(1) a plurality of poles and

(2) permanent magnets for magnetizing the armature poles;

C. the arcuate extent of each of the armature poles being greater than one-half of the pitch of said main field poles and substantially less than the main field pole pitch,

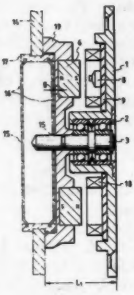
D. the numbers of said main field poles and armature poles and the arcuate extent of the each of the main field poles being such that within any 180 degree sector no more than one boundary between said armature poles is opposite a space between two of said main field poles for any given armature position,

E. said motor further comprising auxiliary poles disposed in the gaps between the main field poles.

4,874,976
SPINDLE MOTOR FOR DRIVING DISCS

Masahiro Ohsawa, and Eiichi Yonezawa, both of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Aug. 8, 1988, Ser. No. 229,663
Claims priority, application Japan, Sep. 4, 1987, 62-221483
Int. Cl.[4] H02K *1/22, 21/12*
U.S. Cl. 310—268 3 Claims

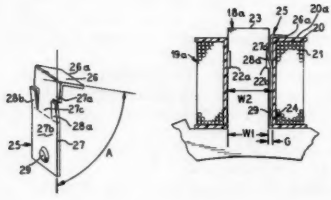


1. A spindle motor for driving a magneto-optical disc, being of compact size, comprised of a non-magnetic clamping rotor having an upper and lower face, a set of stator coils, and a plurality of field magnets which are internally mounted abutting said lower face of the clamping rotor, operative to fixedly hold said magneto-optical disc in a non-contacting manner with respect to said field magnets and in a predetermined position at an end portion of a motor driven shaft by a magnetic flux of said internally-mounted field magnets which attract a mounting disc of magnetic material attached to said magneto-optical disc.

4,874,977
STATOR ASSEMBLY HAVING COIL BOBBINS WITH RETAINING CLIPS

Edward J. Safranek, Arlington Heights, Ill., assignor to F & B Mfg. Co., Gurnee, Ill.

Filed May 9, 1988, Ser. No. 191,878
Int. Cl.[4] H02K *1/18, 15/02*
U.S. Cl. 310—269 7 Claims



1. A stator, comprising:

a plurality of stacked laminations forming a stator assembly having a plurality of pole legs;

at least one of the pole legs having a bobbin with an associated coil wound and impregnated thereon slidably received on the pole leg;

locking clip means inserted in a gap between a side of the pole leg and a side of an aperture of the bobbin for retaining the bobbin on the pole leg, an opposite side of the pole leg being flush with an opposite side of the aperture;

said pole legs being rectangular in cross section, having a cross-sectional area at an end face which is the same as a cross-sectional area interiorly of the end face, and having at least one notch provided in a side thereof;

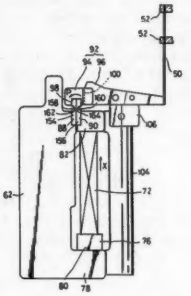
said locking clip means comprising a springable metal clip having at one end a bent lip which forms an angle of less than 90° relative to a main body portion of the clip, and wherein said main body portion has two springy kick-out tabs which engage in said notch; and

the main body portion also having an embossment extending above the main body portion in a direction which is the same as a direction in which said kick-out tabs extend above the main body portion.

4,874,978
DEVICE FOR MAGNIFYING DISPLACEMENT OF PIEZOELECTRIC ELEMENT OR THE LIKE AND METHOD OF PRODUCING SAME

Atsuo Sakaida, Gifu; Yasuji Chikaoka, Aichi; Yasuo Imoto, Nagoya; Akira Iriguchi, Nagoya, and Yoshiyuki Ikezaki, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jun. 3, 1988, Ser. No. 202,035
Claims priority, application Japan, Jun. 9, 1987, 62-143530; Jun. 12, 1987, 62-90834[U]; Jun. 16, 1987, 62-149535; Oct. 30, 1987, 62-277169; Jan. 23, 1988, 63-13229; Jan. 25, 1988, 63-14019; Jan. 29, 1988, 63-19844; Feb. 2, 1988, 63-23561
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—328 28 Claims



1. A device for magnifying displacement of a piezoelectric element adapted to be displaced by application of voltage thereto, comprising:

a frame extending substantially parallel to a direction of displacement of said piezoelectric element, said piezoelectric element being mounted on said frame;

a movable member fixed to one end of said piezoelectric element with respect to said direction of displacement and adapted to be displaced in a direction substantially parallel to said frame;

a first mount surface formed on said frame and extending substantially parallel to said direction of displacement;

a second mount surface formed on a surface of said movable member which faces said first mount surface and extending substantially parallel to said direction of displacement, said second mount surface facing said first mount surface;

a first leaf spring mounted at a first end portion thereof on said first mount surface and extending substantially parallel to said direction of displacement;

a second leaf spring mounted at a first end portion thereof on said second mount surface and extending substantially parallel to said direction of displacement, said second leaf

spring being positioned adjacent to said first leaf spring; and

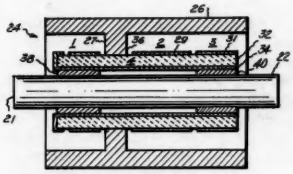
a rolling member fixed to second end portions of said first and second leaf springs, wherein when said piezoelectric element is displaced, said second leaf spring is displaced along said first leaf spring through said movable member to roll said rolling member.

4,874,979

ELECTROMECHANICAL TRANSLATION APPARATUS

Louis N. Rapp, Dansville, N.Y., assignor to Burleigh Instruments, Inc., Fishers, N.Y.

Filed Oct. 3, 1988, Ser. No. 253,162
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—328 6 Claims



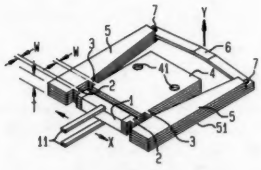
1. An electromechanical translator which comprises a housing, a shaft moveable with respect to said housing, a piezoelectric driver in said housing having a plurality of sections which expand and contract, said sections being disposed in end-to-end relationship, said sections including a first section spaced sufficiently from said shaft so that it remains out of contact with said shaft when it extends, and second and third sections each disposed facing an opposite end of said first section and sufficiently close to said shaft to clamp to said shaft upon expansion thereof, said driver being connected to said housing in an area thereon separate from said first section and spaced from one of the opposite ends of said first section, and means for applying voltages to said first section to change the length thereof and to said second and third sections for the selective clamping thereof to said shaft.

4,874,980

LAMINATED MECHANICAL AMPLIFICATION MECHANISM FOR PIEZOELECTRIC ELEMENTS

Kazuhiro Mine; Kei Sanada, both of Tokyo, and Mitsuteru Ide, Hyogo, all of Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Dec. 19, 1988, Ser. No. 286,245
Claims priority, application Japan, Dec. 17, 1987, 62-320352
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—328 5 Claims



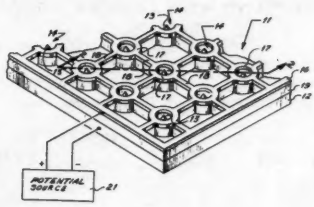
1. A mechanical amplification mechanism for piezoelectric elements comprising: a plurality of base plates laminated to each other, each of said base plates having a pair of fulcrum members protruding from opposite side edges thereof in a first direction, a pair of laminated lever arms respectively fixed to said fulcrum members such that each of said laminated lever arms is fixed to each of said fulcrum members, the longitudinal axes of each of said lever arms being disposed in a second direction which is perpendicular to said first direction, each of said lever arms having first and second portions with said fulcrum member serving as a positional boundary, said first portions being longer than said second portions, each of said base plates and each pair of said lever arms being formed from the same thin metal plate in an integrated form via said fulcrum members, a piezoelectric element fixed between the second portions of said lever arms, and a beam member fixed between the first portions of said lever arms.

4,874,981

AUTOMATICALLY FOCUSING FIELD EMISSION ELECTRODE

Charles A. Spindt, Menlo Park, Calif., assignor to SRI International, Menlo Park, Calif.

Filed May 10, 1988, Ser. No. 192,341
Int. Cl.[4] H01J *1/30, 9/02*
U.S. Cl. 313—309 21 Claims



1. A particle field emission structure comprising, in combination: at least one particle emission site having one or more emitting tips for electrically charged particles; an electrically conductive base structure positioned to provide electrical energy to said emitting tips for electrically charged particles to be emitted therefrom; an electrically conductive control electrode structure positioned at said site for controlling the extraction of particles from said site; means for applying a potential difference between said base structure and said control electrode to extract electrically charged particles from said particle emission site; said control electrode, base structure, and potential applying means being selected to have an electromagnetic interaction between said control electrode and said base structure providing both an extraction potential for said particles and automatically establishing a potential field pattern in the spatial volume adjacent said control electrode structure on the side thereof opposite said base structure which will provide desired trajectories therethrough of particles formed at said site.

4,874,982

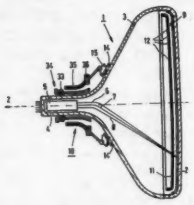
DISPLAY DEVICE WITH ADJUSTABLE DEFLECTION UNIT

Dik R. Overdijk; Antonius J. J. Bolder; Leopold C. M. Beirens, and Piet C. J. Van Rens, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 17, 1988, Ser. No. 208,952
Claims priority, application Netherlands, Jun. 18, 1987, 8701421
Int. Cl.[4] H01J *29/70;* H01F *3/00*
U.S. Cl. 313—440 4 Claims

1. A cathode ray tube display device comprising: an envelope formed by a display window, a neck and a funnel-shaped portion which connects the display window to the neck, a plurality of reference surfaces on said envelope; a plurality of adjustable elements engaging said reference surfaces; a deflection unit mounted on the envelope at the area of the transition

from the neck to the conical part of the envelope, and attached to said adjustable elements for connecting the deflection unit to



the envelope, the position of the deflection unit relative to the envelope being adjustable by adjusting the adjustable elements.

4,874,983

PICTURE DISPLAY SYSTEM INCLUDING A DEFLECTION UNIT WITH A DOUBLE SADDLE COIL SYSTEM

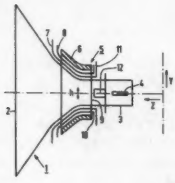
Albertus A. S. Sluyterman, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 19, 1988, Ser. No. 196,652

Claims priority, application Netherlands, May 29, 1987, 8701276

Int. Cl.[4] H01J *29/76*; H01F *3/12*

U.S. Cl. 313—440 **11 Claims**



1. A picture display system including a colour display tube having a neck accommodating an electron gun assembly for generating three electron beams, and an electromagnetic deflection unit surrounding the paths of the electron beams which have left the electron assembly, said deflection unit comprising

a field deflection coil of the saddle type having a front and a rear end for deflecting electron beams generated in the display tube in a vertical direction;

a line deflection coil of the saddle type likewise having a front and a rear end for deflecting electron beams generated in the display tube in a horizontal direction, and a yoke ring of ferromagnetic material surrounding the two deflection coils and having front and rear end faces extending transversely to the tube axis, the electron beam traversing the coils in the direction from the rear to the front ends when the deflection unit is arranged on a display tube, characterized in that the deflection unit also has first and second magnetically permeable portions arranged symmetrically with respect to the plane of symmetry of the field deflection coil on either side of the tube axis, each magnetically permeble portion having a first end located opposite the rear end face of the yoke ring and a second end located at the neck of the display tube in the proximity of the location where the electron beams leave the electron gun assembly, the length of the first and second magnetically permeable portions and their distance to the yoke ring being dimensioned for providing a self-convergent picture display system.

4,874,984

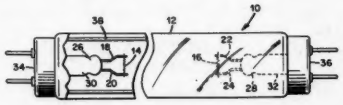
FLUORESCENT LAMP BASED ON A PHOSPHOR EXCITED BY A MOLECULAR DISCHARGE

A. Gary Sigai, Lexington; Walter P. Lapatovich, Hudson, and Michael N. Alexander, Lexington, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Apr. 11, 1988, Ser. No. 179,815

Int. Cl.[4] H01J *1/63, 63/04*

U.S. Cl. 313—486 **4 Claims**



1. A green emitting fluorescent lamp comprising a glass envelope having an inner wall, said inner wall of said glass envelope being coated with a manganese doped magnesium aluminate phosphor which emits visible light upon absorption of ultraviolet radiation of about 206 nm, said fluorescent lamp having corrosion resistant filamentary electron emitting electrodes, and said glass envelope enclosing a fill material which forms a plasma emitting ultraviolet radiation of about 206 nm during electrical discharge, said fill material comprises an iodine containing molecular vapor and an inert gas selected from the group consisting of neon, argon, krypton, xenon, and mixtures thereof.

4,874,985

PHOSPHOR AND ELECTRON EXCITED FLUORESCENT DISPLAY DEVICE USING THE SAME

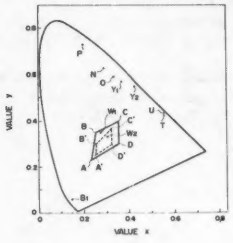
Takashi Hase, Ebina, and Hidemi Yoshida, Odawara, both of Japan, assignors to Kasei Optonix Limited, Japan

Continuation of Ser. No. 925,495, Oct. 29, 1986, abandoned, which is a continuation of Ser. No. 669,430, Nov. 8, 1984, abandoned, which is a division of Ser. No. 467,395, Feb. 17, 1983, abandoned. This application Jul. 25, 1988, Ser. No. 224,285

Claims priority, application Japan, Feb. 19, 1982, 59-25545; Apr. 30, 1982, 59-74006; Apr. 30, 1982, 59-74007; Jun. 7, 1982, 59-97329

Int. Cl.[4] H01J *1/63, 29/20*; C09K *11/54*

U.S. Cl. 313—487 **5 Claims**



1. An electron excited fluorescent display device comprising, as a white emitting ingredient of a fluorscent screen, a sulfide phosphor emitting white light comprising a long after-glow yellow emitting phosphor and a long after-glow blue emitting phosphor, wherein the weight ratio of said long after-glow yellow emitting phosphor to said long after-glow blue emitting phosphor is within the range between 0.34 and 5.00, said long after-glow yellow emitting phosphor being represented by the formula:

$$(Zn_{1-x}Cd_x)S{:}eM^I, fGa, gX'$$

wherein M^I *is at least one of copper and gold, X is aluminum, and x, e, f and g are numbers respectively satisfying the conditions of* $0 \leqq x \leqq 0.3$, $10^{-6} \leqq e \leqq 10^{-2}$, $5 \times 10^{-7} \leqq f \leqq 5 \times 10^{-4}$ and $5 \times 10^{-7} \leqq g \leqq 10^{-3}$; and said long after-glow blue emitting phosphor being represented by the formula:

$$ZnS:aAg, bM^I, cGa, dX$$

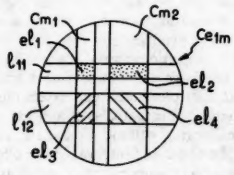
wherein M^I is at least one of copper and gold, X is at least one of chlorine, bromine, iodine, fluorine and aluminum, and a, b, c and d are numbers respectively satisfying the conditions of $5 \times 10^{-6} \leqq a \leqq 10^{-3}$, $0 \leqq b \leqq 2 \times 10^{-4}$, $10^{-8} \leqq c \leqq 10^{-3}$, and $5 \times 10^{-8} \leqq d \leqq 5 \times 10^{-4}$.

4,874,986

TRICHROMATIC ELECTROLUMINESCENT MATRIX SCREEN, AND METHOD OF MANUFACTURE

Roger Menn, 5 rue Latour prolongee, 60140, Liancourt; Christian Brunel, 5 rue Moliere, 92120 Montrouge, and Dario Pecile, 59 rue de la Bourgogne, 95430 Auvers/Oise, all of France

Filed May 20, 1986, Ser. No. 864,979
Claims priority, application France, May 20, 1985, 85 07556
Int. Cl.[4] H01J *1/62*
U.S. Cl. 313—505 **4 Claims**



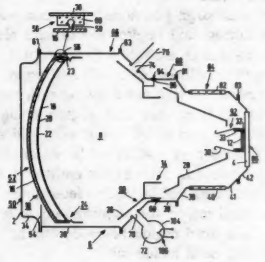
1. In an electroluminescent matrix screen comprising:
(a) two parallel plates;
(b) a plurality of parallel line electrodes comprising n identical adjacent groups of two parallel line electrodes provided on a first plate;
(c) a plurality of parallel column electrodes comprising m identical adjacent groups of two parallel column electrodes provided on a second plate, said parallel column electrodes being perpendicular to the parallel line electrodes; and
(d) light emitting elements in an electroluminescent material provided between the line electrodes and the column electrodes at the cross points of said line electrodes and said column electrodes;
(e) whereby an intersection of the n groups of two parallel line electrodes and the m groups of two parallel column electrodes defines $n \times m$ identical basic cells, each constituted by a two lines by two columns submatrix comprising four electroluminescent elements and
(f) wherein the electrodes have various widths so that the electroluminescent elements have corresponding various areas, the improvement wherein:
(g) the four electroluminescent elements of each basic cell, constituted by a two lines by two columns submatrix, are selected from three different base colors;
(h) said basic cells have each two of their electroluminescent elements emitting the same color;
(i) each line electrode and each column electrode cooperates at most with two colors; and
(j) the various widths of the electrodes and the corresponding areas of the various electroluminescent elements are selected within each cell so as to provide three sources of different colors having similar luminances.

4,874,987

MODULAR X-RAY IMAGE INTENSIFIER TUBE

Bart van der Eijk; Johannes N. van de Wiel; Engelbertus Roosen, all of Heerlen, and Christiaan J. G. H. Wulms, Eindhoven, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 31, 1987, Ser. No. 91,680
Claims priority, application Netherlands, Sep. 2, 1986, 8602212
Int. Cl.[4] H01J *35/16, 43/28*
U.S. Cl. 313—525 **16 Claims**



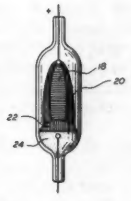
1. An x-ray image intensifier tube of the type comprising an evacuated space having therein an entrance screen, an exit screen, and an electron-optical imaging system, said tube further comprising modules as follows:
an entrance window module,
a jacket module fixed to said entrance window module,
a cone module comprising a conical intermediate ring fixed to said jacket module, said cone module constricting the cross section of said space away from said jacket module,
an exit module, and
an insulator module comprising a first sealing ring, a second sealing ring, and an insulating ring therebetween, said first sealing ring being fixed to said cone module, said exit module being fixed to said second sealing ring.

4,874,988

PULSED METAL HALIDE ARC DISCHARGE LIGHT SOURCE

George J. English, North Reading; Harold L. Rothwell, Jr., Georgetown, both of Mass., and Donald F. Garrity, Jr., Chester, N.H., assignors to GTE Products Corporation, Danvers, Mass.

Continuation of Ser. No. 135,405, Dec. 18, 1987, abandoned. This application May 24, 1989, Ser. No. 356,655
Int. Cl.[4] H01J *61/38*
U.S. Cl. 313—620 **21 Claims**



1. A pulsed metal halide arc discharge light source comprising:
(a) a light-transmissive envelope hermetically enclosing an interior;

(b) an anode and a cathode passing through said envelope and protruding into said interior, the internal terminations of said anode and cathode being spaced apart;

(c) an inert gas and an emissive material within said interior, said emissive material covering said cathode such that there is a minimum gap between said internal termination of said anode and the surface of said emissive material, said emissive material including at least one recrystallized metal halide salt, the temperature of said emissive material being less than one hundred degrees Centigrade during an application of a short duration electrical pulse across said anode and cathode; and

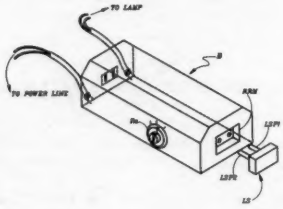
(d) an arc discharge positioned between said anode and cathode during said application of said electrical pulse, said arc discharge including first, second, and third regions emitting colored light, said first region being plume-like and adjacent said metal halide salt, the color of the light emitted from said first region being substantially determined by said metal halide salt, said second region being a central core positioned between said first region and said anode, the color of the emitted light of said second region being substantially determined by said inert gas, said third region surrounding said second region, the color of said third region being determined by said inert gas and said metal halide salt.

4,874,989

ELECTRONIC BALLAST UNIT WITH INTEGRAL LIGHT SENSOR AND CIRCUIT

Ole K. Nilssen, Caesar Dr., Rt. 5, Barrington, Ill. 60010

Filed Dec. 11, 1986, Ser. No. 940,600
Int. Cl.[4] H05B *41/36*
U.S. Cl. 315—151 **20 Claims**



10. The combinations of:

housing means having an outer surface;

ballast circuit means comprised within the housing means, the ballast circuit means: (i) being connectable with a source of electric power, (ii) having control terminal means, and (iii) being operable in a substantially non-dissipative manner to provide an output current at a ballast output, the output current having a magnitude affected by a control input provided to the control terminal means; and

light sensor means connected with the control terminal means and operative, in response to receiving a flux of illumination, to provide said control input, the light sensor means being comprised substantially within said outer surface;

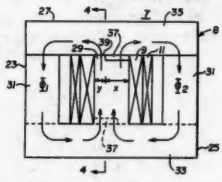
the housing means, the ballast circuit means, and the light sensor means being combined and integrate in such manner as to constitute an integral ballast suitable for use in a lighting fixture for powering a gas discharge lamp.

4,874,990

NOTCH GAP TRANSFORMER AND LIGHTING SYSTEM INCORPORATING SAME

Dennis A. Dobnick, Watseka, Ill., assignor to QSE Sales & Management, Inc., Watseka, Ill.

Filed Aug. 22, 1988, Ser. No. 234,792
Int. Cl.[4] H05B *41/16*
U.S. Cl. 315—276 **22 Claims**



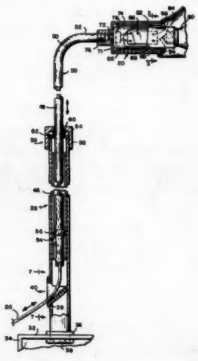
1. A lighting system powered by an ac source producing a sinusoidal voltage waveform, said system comprising a filament lamp, a transformer having a primary winding connected to the ac source and a secondary winding connected to the filament lamp, and a control circuit connected in series with the ac source and the primary winding of the transformer which selectively clips with a substantially zero switching interval the sinusoidal voltage waveform applied to the primary winding of the transformer by the ac source to control the intensity of light produced by the lamp, said transformer having a core of magnetic material upon which said primary and secondary windings are wound and defining a magnetic flux path, and at least one notch gap extending only partially across said magnetic flux path, said at least one notch gap having a volume storing sufficient magnetic energy to delay the duration of the switching interval of the clipped sinusoidal voltage waveform by an amount which substantially eliminates inductive spikes in said clipped sinusoidal voltage waveform to thereby substantially reduce filament ringing.

4,874,991

TOUCH CONTROLLED MULTIPLE POSITION LAMP

Thomas R. Ruskin, 85 E. India Row, Ste. 5F, Boston, Mass. 02110

Filed Jun. 30, 1987, Ser. No. 67,875
Int. Cl.[4] F21S *1/12*
U.S. Cl. 315—362 **18 Claims**



1. A floor lamp comprising a base assembly, an illuminator assembly, and a telescoping tube assembly for positioning said illuminator assembly above said base assembly:

(a) said telescoping tube assembly including a lower tube, an

upper tube, and an inner tube, all composed of metal, said lower tube, said upper tube and said inner tube being substantially coaxial;

(b) said inner tube being split to provide a paraxial opening, which, in cross-section, has a solid sector that subtends an angle of at least 180 degrees and an open sector that subtends an angle of no greater than 180 degrees;

(c) said upper tube having a vertical section that is adjustable within said lower tube in height along its axis and in orientation about its axis;

(d) a projection from said upper tube relatively adjacent to its lower end and relatively remote from its upper end extending into said open sector of the inner tube for setting limits on said orientation;

(e) a fixture for locking said upper tube in adjusted height and adjusted orientation to said lower tube;

(f) said illuminator assembly including an electrical control and a lamp socket;

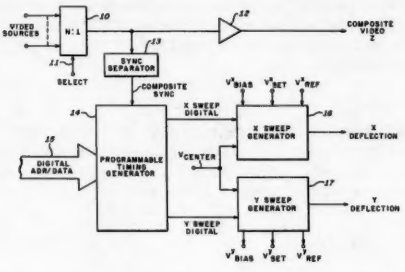
(g) said electrical control being responsive to a change of reactance generated by manual contact with at least one of said base assembly, said telescoping tube assembly and said illuminator assembly; and

(h) an electrical power cord extending from outside of the floor lamp, through the lower tube, through the fixture, through the upper tube and to the electrical control.

4,874,992
CLOSED LOOP ADAPTIVE RASTER DEFLECTION SIGNAL GENERATOR

David J. Benson, Newington, Conn., and James A. Burroughs, San Jose, Calif., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 4, 1988, Ser. No. 228,615
Int. Cl.[4] H01J *29/70, 29/54;* H04N *5/06*
U.S. Cl. 315—387 **9 Claims**



1. Raster deflection signal generation apparatus for use in a video display system having at least one video input channel for displaying a video image on a CRT screen, comprising

programmable timing generator means for providing sweep control signals in accordance with predetermined timing characteristics of said channel and synchronized to a first sync signal said programmable timing generator means including,

means for providing said first sync signal,

means for providing a second sync signal from a composite video signal supplied by said at least one video input channel

phase detector means responsive to said first and second sync signals for providing an error signal representative of a phase difference therebetween,

oscillator means coupled to said first sync means and responsive to said error signal for providing a clock signal at a frequency that phase locks said first and second sync signals,

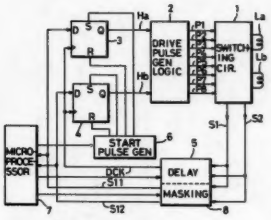
raster sweep generation means responsive to said sweep control signals for generating raster deflection signals, and

servo means responsive to said raster deflection signals for maintaining said raster deflection signals positioned with respect to a predetermined reference so that said video image remains centered on said CRT screen.

4,874,993
SENSORLESS BRUSHLESS MOTOR

Masato Tanaka, and Toshiya Kan, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Sep. 30, 1988, Ser. No. 251,236
Claims priority, application Japan, Oct. 31, 1987, 62-276833
Int. Cl.[4] H02P *6/02*
U.S. Cl. 318—254 **20 Claims**



1. A sensorless brushless motor comprising:

a rotor having a magnet;

an excitation coil;

a switching circuit for performing energization switching of said excitation coil;

a reference position detector for detecting a reference position of rotor rotation based on a voltage induced in said excitation coil by said magnet;

a delay circuit for producing a delay clock signal having clock pulses delayed by a predetermined amount from the reference position detected by said reference position detector;

a delay pulse signal forming circuit for forming a delay pulse signal based on the delay clock signal from said delay circuit;

a switching signal generator for generating an energization switching signal based on the delay pulse signal and supplying the switching signal to said switching circuit; and

a control circuit for detecting a rotational speed of said rotor for controlling the amount of delay in said delay circuit, and adjusting the energization switching position to said excitation coil in accordance with the rotational speed of said rotor.

9. A sensorless brushless motor comprising:

a rotor;

an excitation coil;

a switching circuit for performing energization switching of the excitation coil;

a reference position detector for detecting a reference position of rotor rotation based on a voltage induced in said excitation coil by said rotor;

a delay circuit for producing a delay clock signal having pulses delayed by a predetermined amount from the reference position detected by said reference position detector;

a delay pulse signal forming circuit for producing a delay pulse signal based on the delay clock signal from said delay circuit;

a switching signal generator for generating an energization switching signal fed to said switching circuit in response to the delay pulse signal; and

a masking circuit for forming a noise masking signal based on at least the delay clock signal for suppressing noise pulses in a detection output of said reference position detector at the reference position.

4,874,994
CONTROL CIRCUIT FOR A CONTROLLER FOR USE WITH A CONTROLLED ELEMENT

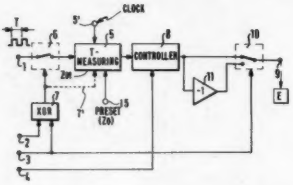
Gerd Eisenberg, Rossdorf, Fed. Rep. of Germany, assignor to BTS Broadcast Television Systems GmbH, Darmstadt, Fed. Rep. of Germany

Filed May 17, 1988, Ser. No. 194,811

Claims priority, application Fed. Rep. of Germany, Jun. 12, 1987, 3719580

Int. Cl.[4] H02P *1/22*

U.S. Cl. 318—257 **6 Claims**



1. A control circuit for providing a control signal output (9) to a reversible controlled element (E), comprising

an actual operating level input (1) for receiving a variable repetition pulse signal;

an actual operating sign output (2);

a command sign input (3);

a command level value input (4);

a measuring circuit (5) receiving signals from said actual operating level input and said command level value input for providing a signal representative of the frequency of the actual operating level input; and

a controller (8) connected to and controlled by said measuring circuit (5) for providing a control signal at said control signal output (9);

said control circuit, in accordance with the invention further comprising:

a controlled gate circuit (6) interposed between said actual operating level input (1) and said measuring circuit (5);

a two-input antivalence circuit (7) forming a conjunctive or AND-function gate (7), connected to the actual operating sign input (2) for receiving a digital operating sign input signal, and also connected to the command sign input (3) for receiving a digital command sign input signal, said two-input antivalence circuit (7) providing an output signal to the gate circuit to control the gate circuit to be conductive if and only if the signs of the two input signals agree;

an inverting circuit (11) connected between the controller (8) and the control signal output (9) for providing an inverted control signal at said control signal output; and

means (10) coupled to said controller and said inverting circuit for selecting one of said control signal and said inverted control signal under the control of the command sign input in dependence on the sign of the signal applied thereto.

4,874,995
PASSIVE SEAT BELT DEVICE

Osamu Kawai, and Shunji Mizumura, both of Fujisawa, Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 12,660, Feb. 9, 1987, abandoned. This application Oct. 18, 1988, Ser. No. 259,406

Claims priority, application Japan, Feb. 14, 1986, 61-29034; Jun. 12, 1986, 61-134796

Int. Cl.[4] H02H *7/08*

U.S. Cl. 318—484 **12 Claims**

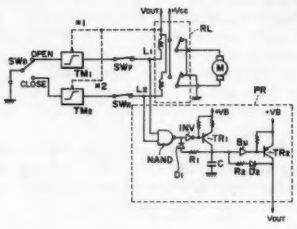
1. A passive seat belt device for automatically fastening and releasing a seat belt, having a driving unit comprising:

a motor for driving the seat belt between a fasten position and a release position, and

means responsive to states of motor energization and motor deenergization for controlling said motor as a function of motor energization time and motor deenergization time in such a manner as to prevent overload of said motor, said controlling means comprising a capacitor which charges during periods of motor energization and which discharges during periods of motor deenergization.

8. A passive seat belt device for automatically fastening and releasing a seat belt, having a driving unit comprising:

a motor for driving the seat belt between a fasten position and a release position, and



means responsive to states of motor energization and motor deenergization for controlling said motor as a function solely of motor energization time and motor deenergization time in such a manner as to prevent overload of said motor, and

wherein said controlling means integrates the motor energization time over successive periods of motor energization and adjusts the integrated motor energization time for deenergization time of intervening periods of motor deenergization, said controlling means controlling said motor in accordance with the adjusted integrated motor energization time.

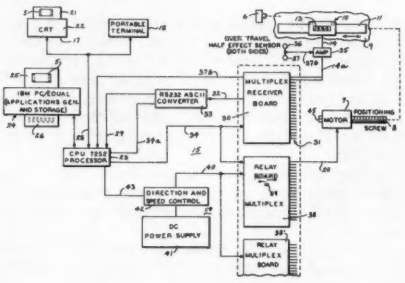
4,874,996
MULTIPLE HEAD WOODWORKING APPARATUS WITH AUTOMATED HEAD POSITIONING APPARATUS

Bruce C. Rosenthal, Sheboygan, Wis., assignor to Kohler General Corporation, Sheboygan Falls, Wis.

Filed Jun. 13, 1988, Ser. No. 206,265

Int. Cl.[4] G05B *19/18*

U.S. Cl. 318—567 **21 Claims**



1. A multiple head woodworking apparatus, comprising a conveyor means including support means for fixedly supporting a series of wood parts and sequentially moving the support means past a plurality of spaced working tools supported in fixed orientation with respect to said parts, means supporting each of said tools for selective linear movement relative to said

conveyor means and having a plurality of linear axis of movement, motors for positioning each of the tools, an absolute electronic scale unit for each axis including a scale having a detectable indicia thereon and a relatively moving electronic readout head coupled to said scale and establishing an output signal directly related to the absolute position of said head on said scale, relative movement of said scale and said readout head in accordance with the positioning of said tool establishing an absolute position signal of the corresponding tool, a control unit having a command signal input, a multiplexing means connected to said heads and to said motors to receive signals corresponding to said position signals and connected to each readout head and to said motor drive unit for positioning said tool on each axis in accordance with a predetermined signal match between said signals.

4,874,997

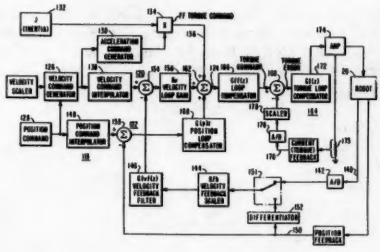
DIGITAL ROBOT CONTROL PROVIDING PULSE WIDTH MODULATION FOR A BRUSHLESS DC DRIVE

Kenneth E. Daggett, Murrysville, Pa.; Elmei M. Onaga, Brookfield Center; Richard J. Casler, Jr., Newtown, both of Conn., and Richard A. Johnson, Murrysville, Pa., assignors to Unimation, Inc., Danbury, Conn.

Continuation of Ser. No. 932,974, Nov. 20, 1986. This application Apr. 1, 1988, Ser. No. 178,813

Int. Cl.[4] G05B *5/00*

U.S. Cl. 318—568.1 **5 Claims**



1. A system for digitally controlling and energizing a brushless DC arm joint motor in a robot control, said system comprising:

three interconnected phase windings for said motor;

a power amplifier having first through sixth switching means interconnected with said windings to direct drive current through series paired windings corresponding to the switching operation of pairs of said switching means;

a digital pulse width modulator circuit having up/down counter means for generating a sawtooth voltage waveform representing counts as a function of time;

means for comparing the counter means count to a voltage signal representing control command so as to digitally control and define the time width of forward and reverse reference control pulses for said power amplifier switching means in accordance with the compared control command voltage signal and the polarity of the control command signal;

means for generating an enabling reference control pulse for each of said reference control pulses;

means for generating a plurality of phase displaced signals representative of motor rotor position;

means for generating respective control pulses which operate the six power amplifier switching means and correspond in time width to said reference control pulses; and

commutating means responsive to said position signals and the polarity of the control command signal to apply successive pairs of said switch control pulses to said switching means so as to produce digitally commutated, pulse width modulated, motor drive current for the command time as the motor current path is commutated from winding pair to winding pair in accordance with the polarity of the control command signal and a predetermined sequence of phase rotation.

4,874,998

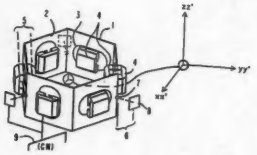
MAGNETICALLY LEVITATED FINE MOTION ROBOT WRIST WITH PROGRAMMABLE COMPLIANCE

Ralph L. Hollis Jr, Yorktown Heights, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 61,930, Jun. 11, 1987, abandoned. This application Jun. 21, 1988, Ser. No. 211,113

Int. Cl.[4] G05D *11/08*

U.S. Cl. 318—568.21 **16 Claims**



1. A six-degree-of-freedom fine motion device, having but a single moving part, comprising:

(a) a stator support unit (9) defining a base and a dual enclosure having dual walls upthrust from the base to define a dual periphery;

(b) a multiplicity of forcer magnets (4) disposed at spaced positions about said dual periphery;

(c) a flotor unit (1) having a related periphery nested in said dual periphery of said stator support unit (9);

(d) forcer elements (5) including a multiplicity of forcer element flotor coils (3) arrayed about said periphery of said flotor unit (1) in active juxtaposition with said forcer magnets (4);

(e) position and orientation sensing means (6) arrayed about said dual periphery of said stator support unit (9) and about said periphery of said flotor unit (1) to sense the relative positions and orientations of said stator support unit and said flotor unit; and

(f) control means connected to said position and orientation sensing means (6) in feedback mode, for providing respective forcer elements (5) with electrodynamic actuation appropriate to maintain equilibrium at a desired starting position and orientation, appropriate to cause motion to a desired final position and orientation according to a force-to-displacement ratio K, and appropriate to provide a desired compliance in at least one degree of freedom by selectively lessening the force-to-displacement ratio K in a related set of forcer elements (5).

4,874,999

AUTOMATIC CONTROL SYSTEM

Takao Kuwabara, Hitachi, and Kazuo Takahashi, Hitachiota, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 23, 1988, Ser. No. 275,367

Claims priority, application Japan, Nov. 25, 1987, 62-295282

Int. Cl.[4] G05B *11/42*

U.S. Cl. 318—610 **8 Claims**

1. An automatic control system for controlling an object comprising:

a first control circuit;

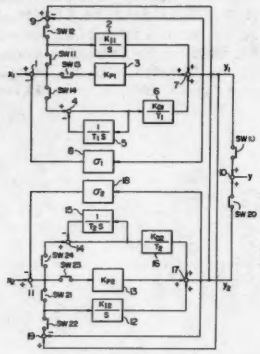
a second control circuit including an integration circuit receiving an error signal between a target signal and a feedback signal, at least one of a proportional circuit and a differentiation circuit receiving the error signal, and an adder circuit for adding an output of the integration circuit and an output of at least one of the proportional

circuit and the differentiation circuit, said feedback signal being provided by an output of the adder circuit; and

a selection circuit for selecting one of the outputs of the first and second control circuits;

said automatic control system further comprising:

first means for applying the error signal to the input of the



integration circuit of the second control circuit when control of the object is switched from the output of the first control circuit to the second control circuit; and

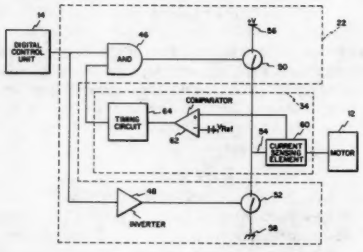
second means for applying the error signal to at least one of the proportional circuit and the differentiation circuit of the second control circuit after the lapse of a predetermined time following the operation of the first means.

4,875,000

CURRENT FAULT DETECTION SYSTEM AND METHOD FOR AC CONTROLLER

John J. Fry, Wickliffe; John W. Robertson, Jr., Chesterland, and Edward Bastijanic, Concord, all of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Continuation of Ser. No. 935,353, Nov. 26, 1986, abandoned.
This application Aug. 10, 1988, Ser. No. 233,929
Int. Cl.[4] H02P *5/40*
U.S. Cl. 318—798 **5 Claims**



1. An overcurrent fault detection system for multiphase AC motor control systems comprising:

digital control means for controlling the motor control system through digital pulses;

multiphase AC power generation means connected to said digital control means for supplying AC multiphase power to a motor, said power generation means including a separate power driving means for generating each phase of the multiphase power and an overcurrent detection means for each phase of said multiphase power permitting an individual power phase to be disabled without disabling the other power phases, each of said power driving means including an AND gate and inverter means, said AND gate and said inverter means each receiving the same signals from said digital control means and producing digital signals that are opposite to each other in logic value, each of said overcurrent detection means including means for sensing the electrical current passing through said individual power phase and producing a signal representative thereof, means for comparing said signal produced by said current sensing means with a signal having a pre-determined magnitude and producing an output signal if the magnitude of said signal produced by said current sensing means exceeds the magnitude of said predetermined signal, and timing means connecting the output of said comparing means to an input of said AND gate, said timing means receiving said output signal produced by said comparing means and producing a signal for disabling said individual power phase for a first pre-determined period of time; and

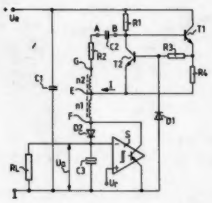
mechanical feedback means attached through a load to the motor to disable the entire motor control system through said digital control means if the motor stalls for a second pre-determined period of time indicating the existence of a severe overcurrent condition in the motor control system.

4,875,001

ELECTRONIC SWITCHING POWER SUPPLY WITH A CHOKE CONVERTER

Günther Bergk, Niedernhausen, Fed. Rep. of Germany, assignor to Braun Aktiengesellschaft, Kronberg, Fed. Rep. of Germany

Filed Dec. 8, 1988, Ser. No. 281,487
Claims priority, application Fed. Rep. of Germany, Dec. 16, 1987, 3742613
Int. Cl.[4] H02M *3/158*
U.S. Cl. 323—223 **5 Claims**



1. A circuitry for regulating the output voltage (Ua) of an electronic switching power supply supplying power to an electrical load (RL) connected in parallel with an output capacitor (C3) from a dc voltage source (Ue) of varying voltage level, including a choke converter having the circuit of a first transistor (T1) connected in series with a choke (n1), said choke (n1) being charged with a rising current in the conductive state of said first transistor while in its off-state the energy stored in said choke (n1) flows through a diode (D1) to said output capacitor (C3) which discharges through said electrical load (RL), with an emitter resistor (R4) which is connected in series with said first transistor (T1) and in parallel with the base-emitter circuit of a second transistor (T2) having its collector connected to the base of said first transistor (T1), and with a feedback coil (n2) magnetically coupled to said choke (n1), said feedback coil (n2) having its one end connected to the base of said first transistor (T1) through a current-limiting resistor (R2) and a feedback capacitor (C2) connected in series, while its other end is connected to the junction of the choke (n1) and the emitter resistor (R4), characterized in that the variation of time (t2) necessary for the regulation of the output voltage (Ua), during which time current flows from said choke (n1) to said output capacitor (C3), is accomplished by means of

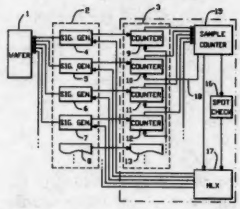
a threshold switch (S) short-circuiting the coil of said choke (n1).

4,875,002

METHOD OF TESTING SEMICONDUCTOR WAFERS

Hideo Sakamoto, Tenri, and Hiroshi Tsugita, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 734,346, May 15, 1985, abandoned.
This application Nov. 24, 1987, Ser. No. 129,895
Claims priority, application Japan, May 30, 1984, 59-112742
Int. Cl.[4] G01R *31/28;* G06F *15/20*
U.S. Cl. 324—73 R 6 Claims



1. A method of testing wafers with many chips thereon comprising the steps of

conducting tests of a plurality of kinds on chips on said wafers during a predetermined initial period,

counting the number of wafers which failed in each of said plurality of kinds of tests,

storing said numbers, and

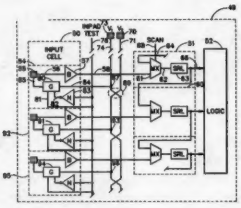
automatically selecting one or more of said plurality of kinds of tests for subsequent testing of wafers on the basis of said stored numbers.

4,875,003

NON-CONTACT I/O SIGNAL PAD SCAN TESTING OF VLSI CIRCUITS

Gary R. Burke, Encinitas, Calif., assignor to Silicon Connections Corporation, San Diego, Calif.

Filed Feb. 21, 1989, Ser. No. 314,510
Int. Cl.[4] G01R *31/28*
U.S. Cl. 324—73 R 5 Claims



1. In a microcircuit device which includes a plurality of input cells, a plurality of output cells, a plurality of serially-connected first boundary scan cells, and a plurality of serially-connected second boundary scan cells, each input cell including an input buffer and an input signal pad connected to the input of the input buffer, each output cell including an output buffer and an output signal pad connected to the output of the output buffer, each of the plurality of first boundary scan cells connected to receive the output of the input buffer of a respective one of said input cells or the output of a respective one of said first boundary scan cells, and each of the plurality of second boundary scan cells connected to provide the input of the output buffer of a respective one of said output cells, said microcircuit device further including means connecting said first boundary scan cells to said second boundary scan cells for serially shifting a pattern of signals into and through said second boundary scan cells, an improvement for signal pad scanning of said input and output cells, wherein said improvement comprises:

a first input stimulus bus;

a second input stimulus bus;

for each of said input cells, a gate circuit having an output connected to the input signal pad of said input cell, a signal input, and a control input connected to said input signal pad test bus, said gate circuit connecting its signal input to its output in response to an input signal pad test signal on said input signal pad test bus;

the signal inputs of said gate circuits being connected alternately to said first and second input stimulus busses;

an output signal pad test bus;

an output signal pad signal bus; and,

for each said output cell:

a gate circuit having an output connected to said output signal pad signal bus, a signal input connected to the output signal pad of said output cell, and a control input, said gate circuit connecting its signal input to its output in response to an output signal pad test control signal on said control input; and,

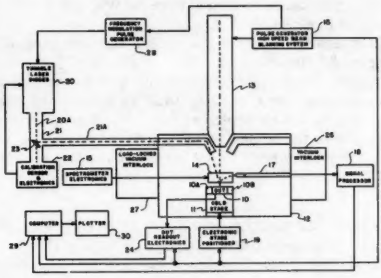
a signal circuit means connected to said output signal pad test bus, said second boundary scan cells, and to said gate circuit control input for generating said output signal pad test control signal in response to the conjunction of a predetermined test pattern serially shifted through said second boundary scan cells and an output pad test signal on said output pad test bus.

4,875,004

HIGH SPEED SEMICONDUCTOR CHARACTERIZATION TECHNIQUE

Phillip R. Boyd, Upper Marlboro, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, Del.

Filed Jun. 1, 1988, Ser. No. 200,813
Int. Cl.[4] G01R *31/26, 31/28*
U.S. Cl. 324—158 D 7 Claims



1. A test system for evaluating LSI arrays of photodiodes with an isolated electrode for each diode and a common electrode for all diodes comprising:

a vacuum chamber including an externally moveable coolable stage means for mounting said array within said chamber;

an electron beam generator mounted on said chamber and focussed on only one isolated electrode of said array;

an externally mounted tuneable laser attached to said chamber with a beam irradiating all diodes in same array;

a current conducting measuring means coupled only between the common electrode of said array and said elec-

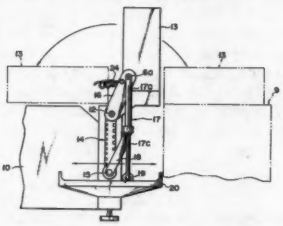
tron beam generator to measure the electro-optical response of each photodiode as function of current between said generator and said common electrode as well as secondary electron emission from said isolated electrode; and

a pulse generating means coupled between said common electrode, said beam generator and said laser to redirect the beam from said generator sequentially to each of at least a first set said diodes and to sequentially tune said laser to a plurality of optical frequencies, such that each diode may be irradiated by said plurality of frequencies.

4,875,005
MECHANISM FOR TURNING OVER A TEST HEAD OF A WAFER PROBING MACHINE

Michimasa Terada, Tokyo, and Hisashi Nakajima, Yamanashi, both of Japan, assignors to Tokyo Electron Limited, Tokyo, Japan

Filed Aug. 5, 1988, Ser. No. 228,491
Claims priority, application Japan, Aug. 7, 1987, 62-199538
Int. Cl.[4] G01R *31/02;* B25B *11/00*
U.S. Cl. 324—158 F **16 Claims**



1. A mechanism for turning over a heavyweight object, comprising:

a quadric crank chain disposed substantially within a vertical plane to support an object of transfer;

slide means coupled to a first movable link corresponding to the side opposite to a fixed link of the quadric crank chain, said sliding means serving to slide the first movable link in vertical direction; and

guide means for supportingly guiding the slide means in a horizontal direction,

said object of transfer being attached to a second movable link corresponding to a side adjacent to the fixed link of the quadric crank chain, so that the object of transfer, along with the second movable link, revolves within the vertical plane when the first movable link slides vertically.

4,875,006
ULTRA-HIGH-SPEED DIGITAL TEST SYSTEM USING ELECTRO-OPTIC SIGNAL SAMPLING

Francois G. Henley, San Jose; Hee-June Choi, Fremont; Dean J. Kratzer, Palo Alto, and Maurice R. Barr, Saratoga, all of Calif., assignors to Photon Dynamics, Inc., San Jose, Calif.

Filed Sep. 1, 1988, Ser. No. 239,577
Int. Cl.[4] G01R *19/00, 5/28*
U.S. Cl. 324—158 R **8 Claims**

1. A high-speed test system for semiconductor integrated circuits comprising

an adapter board for receiving a circuit for test,

a plurality of driver circuits positioned around said adapter board,

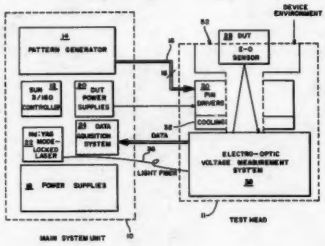
an electro-optic sensor positioned below said adapter board,

connector means connecting said plurality of driver circuits to contacts of a circuit undergoing test and for connecting contacts of a circuit undergoing test to said electro-optic sensor,

electro-optical voltage measuring means,

laser means for generating light sampling pulses,

optical means for directing said light sampling pulses to said electro-optic sensor and for directing said light sampling pulses from said electro-optic sensor to said electro-optic voltage measuring means, and

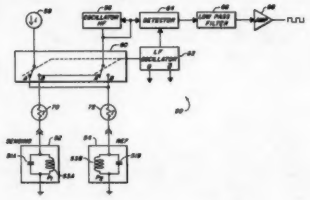


control means for controlling operation of said driver circuits, said electro-optical voltage measuring means and said optical means, said control means including a test signal pattern generator, a system time base, and data acquisition means.

4,875,007
EDDY CURRENT PROXIMITY SYSTEM

Haskell Ginns, Belmont, Mass., assignor to The Indikon Company, Inc., Cambridge, Mass.

Continuation of Ser. No. 159,507, Feb. 17, 1988, abandoned, which is a continuation of Ser. No. 786,145, Oct. 8, 1985, abandoned, which is a continuation of Ser. No. 444,442, Nov. 24, 1982, abandoned. This application Dec. 30, 1988, Ser. No. 292,640
Int. Cl.[4] G01B *7/14;* G01N *27/90*
U.S. Cl. 324—207 **8 Claims**



1. An eddy-current probe system for detecting distance to a metallic target comprising:

a first probe for sensing the metallic target at a first distance and providing a first output corresponding to the first distance of said first probe to the metallic target;

a second probe for sensing a metallic reference target at a reference distance and providing a second output corresponding to the reference distance of said second probe to the metallic reference target;

said first and second outputs having amplitudes compensated for environmental effects experienced by said first and second probes;

a first source of excitation comprising a single high frequency oscillator providing a high frequency AC excitation signal;

means for providing resonant tuning of said first and second probes in response to excitation from said single high frequency oscillator;

switch means connected to said first probe, said second

probe and said single high frequency oscillator for selectively energizing each said first and second probes by said high frequency AC excitation signal from said single high frequency oscillator periodically wherein said first and second probes periodically provide said first and second outputs respectively representative of the first and the reference distances;

means for causing said switch means to periodically switch said high frequency Ac excitation signal from said single high frequency oscillator between said first and second probes, respectively;

alternate excitation of said first and second probes by said single high frequency oscillator providing periodically said first and second outputs having amplitudes similarly affected by environment effects; and

means for providing a periodic output signal having an amplitude variation corresponding to differences in amplitude between the periodically provided first and second outputs and compensated for environmental effects due to said alternate excitation of said first and second probes by said single high frequency oscillator, the amplitude variation corresponding to the first distance of said first probe to the metallic target.

4,875,008

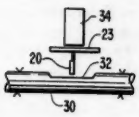
DEVICE FOR SENSING THE ANGULAR POSITION OF A SHAFT

David M. Lorenzen, Hamden, Conn., assignor to North American Philips Corporation, New York, N.Y.

Filed Feb. 16, 1988, Ser. No. 156,101

Int. Cl.[4] G01B *7/14*; G01R *33/02*; H03K *17/00*; H01L *43/06*

U.S. Cl. 324—208 **12 Claims**



1. The combination of a shaft rotatable about a central axis between first and second angular positions and a device for sensing the angular position of said shaft, said combination comprising:

a magnet arranged with its polar axis perpendicular to the axis of said shaft for creating a magnetic field between said magnet and said shaft;

a sensing portion extending over a distance on said shaft for changing the direction of said magnetic field as said shaft is rotated between said first and second angular positions; said sensing portion having a cross section exhibiting a minimum radius and symmetrically increasing radius on either side of said minimum radius;

a directionally responsive sensing element situated in said directionally changing magnetic field between said shaft and said magnet, said element being substantially perpendicular to said axis of said shaft, said element producing thereacross a resistance which varies at least substantially linearly as a function of the direction of the field as said shaft is rotated from said first position to said second position.

4,875,009

CIRCUIT BOARD AND SENSING COIL POSITIONING SYSTEM FOR PROXIMITY SENSOR

Denis J. Leveque, Milwaukee, Wis., assignor to Eaton Corporation, Cleveland, Ohio

Filed Dec. 16, 1987, Ser. No. 133,819

Int. Cl.[4] G01B *7/14*; G01R *33/00*; G01N *27/72*

U.S. Cl. 324—208 **20 Claims**

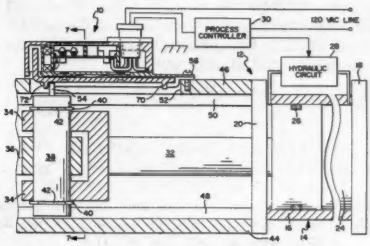
1. A proximity switch for use with a power actuated device including a member mounted for movement between predetermined limits of travel, said switch comprising:

means operative to change conductive state in response to a control signal;

a substantially closed housing assembly defining a cavity therein, said housing assembly including means operative to shield at least a portion of said cavity from external electromagnetic fields;

retainer means formed of non-ferrous, electrical insulating material nestingly received within said cavity and defining a coil receiving recess within said shielded cavity portion;

a generally toroidal, open core inductive circuit element disposed in a fixed, predetermined orientation within said recess;



means operative to electrically energize said inductive element to establish a flux field having a characteristic amplitude thereabout substantially within said shielded cavity portion;

target means disposed substantially within said shielded cavity portion and displaceable along an axis of said inductive element between a position remote from said inductive element wherein said target means is substantially outside of said flux field and a sensed position adjacent said element wherein said target means is within said flux field to effect a change in said characteristic amplitude;

circuit means operative to generate said control signal as a function of said change in characteristic amplitude; and

means operatively engaging said target means to effect displacement thereof in response to said member movement.

4,875,010

CIRCUIT FOR DETECTING AC MAGNETIC FIELD DUE TO MAGNETIC RESONANCE WITH A VARIABLE RESISTANCE FOR NOISE SUPPRESSION

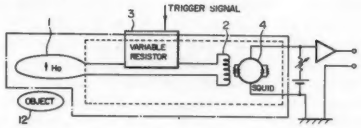
Koichi Yokosawa, Kokubunji; Etsuji Yamamoto, Akishima; Hideaki Nakane, Hachioji; Masao Yabusaki, Tokyo, and Yukiko Ogura, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 28, 1988, Ser. No. 174,424

Claims priority, application Japan, Mar. 28, 1987, 62-74887

Int. Cl.[4] G01V *3/00*; G01R *33/02*

U.S. Cl. 324—248 **18 Claims**



1. A circuit for detecting, during a signal detection period, an AC magnetic field due to magnetic resonance in an object which lies in a DC magnetic field wherein the strength of said

DC magnetic field changes in periods other than said signal detection period, said circuit comprising:

a superconducting receiving coil disposed such that the magnetic flux of said AC magnetic field is superimposed on the magnetic flux of said DC magnetic field and penetrate said superconducting receiving coil;

a superconducting flux meter having a superconducting input coil;

a variable resistor, the resistance value thereof being controlled to a lower value during said signal detection period and controlled to a higher value when said DC magnetic field is changed; and

superconducting connection means for connecting said receiving coil, said input coil and said variable resistor so that a superconducting closed loop into which said variable resistor is inserted is formed and that a signal indicative of magnetic flux penetrating through said receiving coil and is applied to said input coil;

4,875,011

MAGNETIC SENSOR USING INTEGRATED SILICON HALL EFFECT ELEMENTS FORMED ON THE (100) PLANE OF A SILICON SUBSTRATE

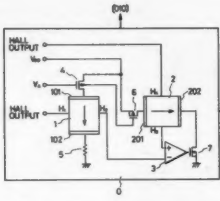
Masayuki Namiki; Masanori Gouda, and Masaaki Kamiya, all of Tokyo, Japan, assignors to Seiko Instruments Inc., Japan

Filed Mar. 4, 1987, Ser. No. 21,671

Claims priority, application Japan, Mar. 7, 1986, 61-49769

Int. Cl.[4] H01L *27/22, 43/06;* **G01R** *33/06;* **H03K** *17/90*

U.S. Cl. 324—251 **12 Claims**



1. A magnetic sensor comprising: a silicon single crystal substrate; a first Hall effect device and a second Hall effect device for effecting a magneto-electrical conversion, the Hall effect devices being formed on a major surface of the silicon single crystal substrate which is substantially parallel to the (100) crystalline plane, each of the Hall effect devices having a pair of opposed drive electrodes for flowing therebetween a drive current effective to drive the Hall effect device, and a pair of opposed Hall terminals for developing therebetween a Hall voltage when the Hall effect device is exposed to an external magnetic field, said first and second Hall effect devices being arranged such that the flowing direction of drive current is substantially parallel to the <100> or <010> crystalline axis; detecting means connected between one of the pair of Hall terminals of the first Hall effect device and one of the pair of Hall terminals of the second Hall effect device for detecting potential difference between said two Hall terminals to produce at the output of the detecting means a control signal representative of the potential difference; and shifting means connected to one of the pair of drive electrodes of the second Hall effect device and having a control terminal connected to the output of the detecting means, said shifting means shifting the potential of said one of the drive electrodes in response to the control signal such that a voltage of said one of the Hall terminals of the second Hall effect device is shifted nearly equal to a voltage of said one of the Hall terminals of the first Hall effect device.

4,875,012

IMAGE RECONSTRUCTION METHOD IN NUCLEAR MAGNETIC RESONANCE IMAGING SYSTEM

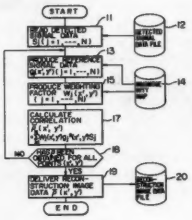
Akira Maeda, Machida; Koichi Sano, Sagamihara; Tetsuo Yokoyama, Tokyo; Hideaki Koizumi, Katsuta, and Hirotaka Mizuno, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 8, 1988, Ser. No. 153,199

Claims priority, application Japan, Mar. 20, 1987, 62-63766; May 15, 1987, 62-116804; Oct. 23, 1987, 62-266368

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—309 **15 Claims**



1. An image reconstruction method in a nuclear magnetic resonance imaging system comprising magnetic field generating means for generating a static magnetic field, time-varying gradient magnetic fields and an RF magnetic field, means for controlling said magnetic field generating means in accordance with a predetermined procedure, means for detecting a nuclear magnetic resonance signal from a desired region in an object of interest, means for converting the detected signal into digital data, and means for performing various operations on the digital data, said method comprising:

a step of producing reference signal data at any given position in the object region defined by the gradient magnetic fields; and

a step of calculating a correlation of the produced reference signal data, a predetermined weighting factor and said digital data, thereby reconstructing an image of the object region.

4,875,013

HIGH-FREQUENCY COIL FOR NUCLEAR MAGNETIC IMAGING

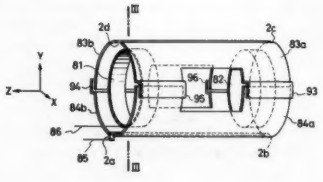
Yoshiki Murakami, Tokyo; Etsuji Yamamoto, Akishima; Masao Yabusaki, and Hideki Kohno, both of Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 2, 1988, Ser. No. 162,982

Claims priority, application Japan, Mar. 13, 1987, 62-56524; Jul. 31, 1987, 62-192287

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—318 **2 Claims**



1. A high-frequency coil for nuclear magnetic imaging comprising:

an even number of outer conductors that are provided with

at least one set of opposing positions on a cylindrical surface having a center axis, each of said conductors having a central band portion in parallel with the center axis of the cylindrical surface and having at least two wing portions each with a tip, said wing portions extending from both end parts of a side edge of said central band portion;

first and second ring-like inner conductors on the inside of said wing portions of said outer conductors and capacity-coupled to said even number of outer conductors, respectively, said inner conductors having a width different from the width of said wing portions; and

neighboring tips of said wing portions being opposed to each other and separated via an air gap with a dielectric means having a desired dielectric constant, said dielectric means being insertable in said air gap.

4,875,014

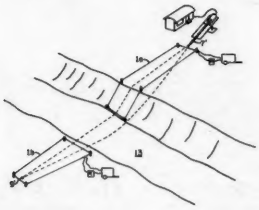
SYSTEM AND METHOD FOR LOCATING AN UNDERGROUND PROBE HAVING ORTHOGONALLY ORIENTED MAGNETOMETERS

George F. Roberts, Georgetown, and Philip H. Walters, Austin, both of Tex., assignors to Tensor, Inc., Round Rock, Tex.

Filed Jul. 20, 1988, Ser. No. 221,730

Int. Cl.[4] E21B *47/022, 47/09, 47/12, 7/04*

U.S. Cl. 324—326 **7 Claims**



1. A method for tracking the progress of a borehole made by a drilling assembly, comprising the steps of:

generating a magnetic field by flowing a constant current through a conductive loop made up of straight segments placed on the surface of the ground above the proposed path of the borehole;

measuring the magnetic field by means of a probe fixed to the drilling assembly with three orthogonally oriented magnetometers;

iteratively calculating the theoretical magnetic field vector produced by the current flowing through the conductive loop at discrete points below the conductive loop until the calculated field vector is approximately equal to the measured magnetic field vector;

determining the location of the probe as being that point below the ground surface where the measured magnetic field vector most nearly matches the theoretically calculated magnetic field vector.

4,875,015

MULTI-ARRAY BOREHOLE RESISTIVITY AND INDUCED POLARIZATION METHOD WITH MATHEMATICAL INVERSION OF REDUNDANT DATA

Stanley H. Ward, Salt Lake City, Utah, assignor to University of Utah Research Institute, Salt Lake City, Utah

Continuation-in-part of Ser. No. 75,690, Jul. 20, 1987, abandoned. This application Jul. 19, 1988, Ser. No. 221,279

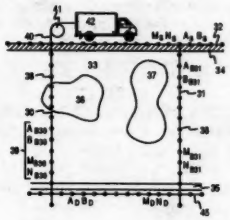
Int. Cl.[4] G01V *3/00, 3/08, 3/18, 3/38*

U.S. Cl. 324—323 **22 Claims**

1. A method for conducting a geophysical survey, comprising:

establishing a multiplicity of sites, each said site being located on or beneath the surface of the earth, said sites being spaced to define travel paths for energy between respective pairs of said sites through a subsurface region at least one of said sites being beneath the surface of the earth;

energizing said subsurface region by applying electric or electromagnetic energy at a said site;



measuring electric or magnetic quantities at other of said sites, thereby to collect a quantity of overdetermined redundant data related to the resistivity of said subsurface region; and

mathematically inverting said redundant data to determine the resistivity or induced polarization values of cells within said subsurface region.

4,875,016

TRANSDUCER AND RELATED CIRCUITRY

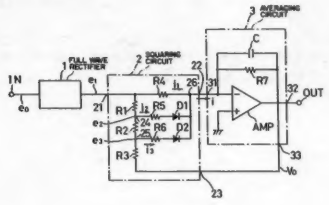
Hideaki Nakamura, Joyo; Tamotsu Shimamori, Nagaokakyo, and Shinichi Murashige, Kyoto, all of Japan, assignors to Omron Tateisi Electronics Company, Nagaokakyo, Japan

Division of Ser. No. 903,976, Sep. 5, 1986. This application Aug. 17, 1987, Ser. No. 85,963

Claims priority, application Japan, Sep. 5, 1985, 60-196714; Sep. 27, 1985, 60-215645; Oct. 28, 1985, 60-241808; Oct. 28, 1985, 60-241809

Int. Cl.[4] H03K *5/00*

U.S. Cl. 328—26 **3 Claims**



1. An AC effective value-DC conversion circuit, comprising:

a squaring circuit having an input unit for receiving a rectified voltage which is to be effective value converted, an output unit for outputting a squared electric current, and a negative feedback input unit for inputting a negative feedback voltage; and

an averaging circuit having an input unit for receiving the squared electric current from the output unit of the squaring circuit, and an output unit for outputting an effective value voltage of the rectified voltage, and outputting the rectified voltage as a feedback voltage to the negative feedback input unit;

the squaring circuit comprising:

a first conversion means for converting the rectified voltage given to the input unit thereof into an electric current which is proportional to the rectified voltage value;

a second conversion means including (a) voltage dividing means for dividing a total voltage obtained by adding the rectified voltage and said feedback voltage, (b) voltage-to-current converting means directly connected to said voltage dividing means for converting a voltage divided by said voltage dividing means into a current, and (c) rectifying means for rectifying said current from said voltage-to-current converting means; and

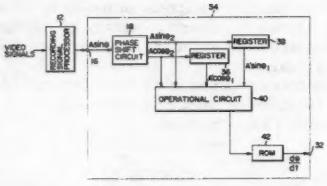
a summing means for summing the electric currents from the two conversion means and outputting the summed current as the squared electric current.

4,875,017

DIGITAL FM DEMODULATING APPARATUS

Yoshihisa Sakazaki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 6, 1988, Ser. No. 280,353
Claims priority, application Japan, Dec. 8, 1987, 62-310020
Int. Cl.[4] H03D 3/00
U.S. Cl. 329—336 5 Claims



1. A digital FM demodulating apparatus comprising:

generating means for generating a pair of digital FM signals having a phase difference of 90° on the basis of an input digital FM signal;

delay means for delaying the pair of digital FM signals generated by said generating means by a predetermined time period;

calculating means for calculating data such that a result of synthesis of outputs from said generating means and said delay means becomes a value obtained by differentiating a phase component of the input digital FM signal by a time; and

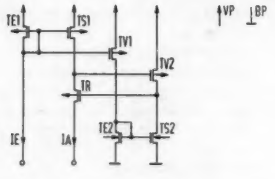
converting means for performing $\tan^{-1}$ conversion in accordance with the output data from said calculatingmeans in order to obtain the phase component of the input digital FM signal.

4,875,018

CURRENT MIRROR CIRCUIT ASSEMBLY

Dieter Draxelmayr, Villach, Austria, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 18, 1987, Ser. No. 99,104
Claims priority, application Fed. Rep. of Germany, Sep. 24, 1986, 3632432
Int. Cl.[4] H03F 3/16
U.S. Cl. 330—288 6 Claims



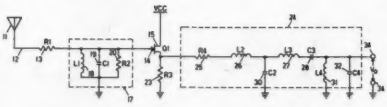
1. Current mirror circuit assembly, comprising a first current mirror circuit formed of a first input transistor connected as a diode and a first mirror transistor, said input transistor and said mirror transistor having gate terminals connected to one another and output circuits with output terminals, one of said output terminals of each of said input transistor and said mirror transistor being connected to a supply potential, a regulating transistor having an output circuit connected in series with said output circuit of said mirror transistor, a second current mirror circuit formed of respective second input and mirror transistors with respective output circuits, other transistors each having respective gates, each being controlled by another one of said output terminals of a respective one of said first input transistor and said first mirror transistor, one of said other transistors having a feedback connected to said regulating transistor, and said other transistors being connected to said output circuits of said second transistors of said second current mirror circuit.

4,875,019

RECEIVER PREAMPLIFIER WITH TUNED CIRCUIT ADAPTED FOR LORAN RECEPTION

Mark B. Monson; Thomas P. Blandino, both of Madison; Dennis E. Bahr, Middleton, and Kendall E. Post, Madison, all of Wis., assignors to Bahr Technologies, Inc., Madison, Wis.

Filed Jul. 21, 1988, Ser. No. 222,723
Int. Cl.[4] H03F 3/191, 3/16
U.S. Cl. 330—302 39 Claims



1. A preamplifier system for a receiver adapted to be connected to an antenna to receive a radio signal of a particular selected carrier frequency, such as a LORAN-C radio signal, and having a passband of frequencies which includes the selected carrier frequency, comprising:

(a) input means for receiving the signal from the antenna;

(b) a high input impedance buffer amplifier with an input and output and having its input connected to the input means;

(c) a parallel tuned circuit connected between the input to the buffer amplifier and ground, the tuned circuit comprising the parallel combination of an inductance, capacitance and resistance, the values of which are selected to provide a resonant frequency which will pass the carrier frequency of the particular signal to be received; and

(d) a secondary filter section connected to the output of the buffer amplifier.

4,875,020

ANALOG INTEGRATED CIRCUIT HAVING INTRINSIC TOPOLOGIES AND CHARACTERISTICS SELECTABLE BY A DIGITAL CONTROL

Vincenzo Daniele, Brugherio; Marco M. Monti, Milano; Michele Taliercio, Arluno, and Piero Capocelli, Milano, all of Italy, assignors to SGS-Thomson Microelectronics s.r.l., Italy

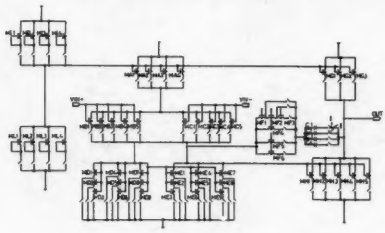
Filed Dec. 21, 1988, Ser. No. 287,299
Claims priority, application Italy, Dec. 22, 1987, 83684 A/87
Int. Cl.[4] H03F 3/04, 3/16
U.S. Cl. 330—307 17 Claims

7. An integrated operational amplifier having intrinsic characteristics selected by digital control means among an arbitrary large number of intrinsic characteristics which may be exhibited by the integrated operational amplifier, which has

batteries of transistors and of compensation capacitors, each of said batteries circuitally representing a transistor and a compensation capacitor, respectively, of the functional circuit of the operational amplifier;

an integrated selection switch functionally connected in series with each transistor and each compensation capacitor of said batteries of transistors and of capacitors;

the selection of a certain transistor and of a certain capacitor belonging to said respective batteries by means of the closing of the relative integrated switch in order to form a



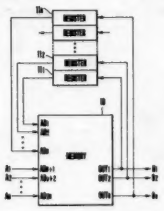
functional circuit of the integrated operational amplifier having certain intrinsic characteristics corresponding to the ensemble of the intrinsic characteristics of the selected circuit components which compose the amplifier being effected by means of a nonvolatile memory integrated on the same chip as the operational amplifier and permanently programmed.

4,875,021

PSEUDO-NOISE SEQUENCE GENERATOR

Noriyoshi Sonetaka, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 1, 1988, Ser. No. 214,077
Claims priority, application Japan, Jul. 1, 1987, 62-164271
Int. Cl.[4] H03B *29/00*
U.S. Cl. 331—78 **2 Claims**



1. A pseudo-noise sequence generator comprising:

a memory accessed by a 2n-bit address signal to output a parallel n-bit pseudo-noise sequence, n out of 2n address signal input terminals of said memory receiving n parallel digital signal bits; and

n registers for delaying each bit of n-bit data output from said memory by one clock and outputting the delayed n-bit data, the outputs from said n registers being supplied to remaining n address signal input terminals of said 2n address signal input terminals of said memory in one-to-one correspondence,

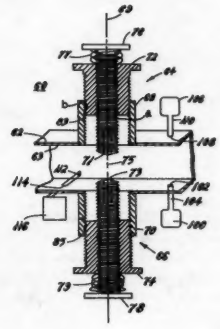
wherein said memory prestores pseudo-noise sequence data corresponding to an address signal input from said 2n address signal input terminals.

4,875,022

HIGH POWER MICROWAVE EXPANDER FOR PRODUCING FAST RISE TIME PULSES

Mark D. Berry, Columbia; Robert J. Tan, Beltsville, and Robert V. Garver, Boyds, all of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 28, 1988, Ser. No. 174,283
Int. Cl.[4] H03K *5/04, 3/537*
U.S. Cl. 333—20 **28 Claims**



11. An apparatus for producing high power microwave pulses that have extremely fast rise times compared to rise times of a signal delivered from a microwave signal source comprising:

a rectangular waveguide transmission line having input and output ends and a predetermined internal pressure, said waveguide transmission line having a spark gap ranging from about 0.01–0.10 inch positioned between said input and output ends;

means for coupling said microwave signal source to said input end of said waveguide transmission line; and

means for coupling a load to said output end of said waveguide transmission line; whereby

said microwave signal source delivers an input pulse, having a rise time, via said input end of said waveguide transmission line to the spark gap, the spark gap presenting a high impedance during the initial rise of the input pulse until the power of the input pulse reaches an arcing threshold of said spark gap causing said spark gap to arc, resulting in an output pulse delivered to said load that has a rise time that is faster than the rise time of the input pulse.

4,875,023

VARIABLE ATTENUATOR HAVING VOLTAGE VARIABLE FET RESISTOR WITH CHOSEN RESISTANCE-VOLTAGE RELATIONSHIP

Barak Maoz, Highland Park, N.J., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed May 10, 1988, Ser. No. 192,193
Int. Cl.[4] H01P *1/22*
U.S. Cl. 333—81 R **31 Claims**

1. A variable attenuator comprising:

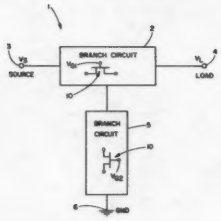
(a) a first branch circuit coupled to a source terminal and a load terminal, said first branch circuit including at least one voltage variable FET resistor having output and input terminals and a control voltage terminal;

(b) a second branch circuit coupled to said first branch circuit and a common terminal, said second branch circuit including at least one voltage variable FET resistor having input and output terminals and a control voltage terminal;

(c) each of said voltage variable FET resistors comprising:

(i) a FET network including a plurality of FET segments

having source, drain and gate electrodes, the drain electrodes of each of the plurality of FET segments being coupled to said output terminal, the source electrodes of each of the plurality of FET segments being coupled to said input terminal, and the gate electrodes of each of the plurality of FET segments being coupled



to said control voltage terminal, each of said plurality of FET segments having a predetermined gate width; and

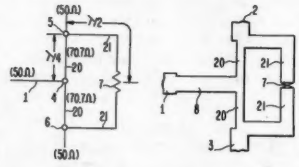
(ii) a voltage divider network coupled to said gate electrodes of said plurality of FET segments for providing a different predetermined gate voltage to each of said gate electrodes.

4,875,024

LOW LOSS POWER SPLITTER

Thomas E. Roberts, Saratoga, Calif., assignor to Ford Aerospace Corporation, Newport Beach, Calif.

Filed Dec. 5, 1988, Ser. No. 279,757
Int. Cl.[4] H01P 5/12
U.S. Cl. 333—127 **7 Claims**



1. Apparatus for splitting electromagnetic energy, comprising:

an input conductor having an input port at one end thereof;

two output conductors, each having an output port at one end thereof;

first and second impedance transforming conductors that are each substantially a quarter of a wavelength long and that couple the input port to the two output ports, respectively;

an isolation resistor, having first and second ends, positioned between the two output ports; and

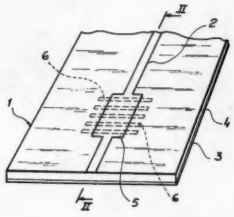
first and second unity impedance transformers that couple the first and second ends of the isolation resistor, respectively, with the first and second output ports, respectively, wherein each unity impedance transformer is substantially one-half wavelength long.

4,875,025

MICROSTRIP TRANSMISSION LINE FOR COUPLING TO A DIELECTRIC RESONATOR

Carlo Buoli, Mirandola, Italy, assignor to Siemens Telecomunicazioni S.p.A., Milan, Italy

Filed Apr. 29, 1987, Ser. No. 44,011
Claims priority, application Italy, May 14, 1986, 20428 A/86
Int. Cl.[4] H01P 7/06
U.S. Cl. 333—230 **8 Claims**



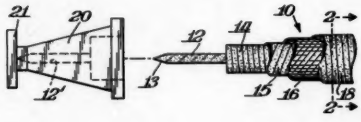
1. A microstrip transmission line for coupling to a dielectric resonator comprising a conductive path and a metallic ground plane applied to opposite faces of an insulating support characterized in that the ground plane has a plurality of parallel slots placed under said conductive path and transversely thereto for coupling the resonator at only a resonant frequency and not disturbing the transmission line at other frequencies, the conductive path being provided with an enlarged portion arranged above the plurality of parallel slots.

4,875,026

DIELECTRIC WAVEGUIDE HAVING HIGHER ORDER MODE SUPPRESSION

Jeffrey A. Walter, Wilmington; Kailash C. Garg, Newark, and Joseph C. Rowan, Wilmington, all of Del., assignors to W. L. Gore & Associates, Inc., Newark, Del.

Filed Aug. 17, 1987, Ser. No. 86,403
The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.
Int. Cl.[4] H01P 1/162
U.S. Cl. 333—251 **13 Claims**



1. A dielectric waveguide for the transmission of electromagnetic waves having a dominant mode and higher order modes, said dielectric waveguide comprising:

(a) a core of PTFE;

(b) at least one layer of PTFE cladding wrapped around said core;

(c) a higher order mode suppression layer of an electromagnetically lossy material covering said cladding, said higher order mode suppression layer providing suppression of modes other than the dominant mode;

(d) an electromagnetic shielding layer covering said mode suppression layer; and

(e) a carbon-filled PTFE tape covering said electromagnetic shielding layer.

4,875,027

WAVEGUIDE TWIST

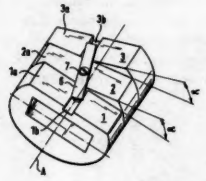
Georg Spinner, Am Eichberg 12/8152, Feldkirchen-Westerham, Fed. Rep. of Germany

Filed Sep. 22, 1988, Ser. No. 247,916

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1987, 3733397

Int. Cl.[4] H01P *1/02*

U.S. Cl. 333—254 13 Claims



1. A waveguide twist; comprising:

a plurality of waveguide sections, the number of which being at least three, said waveguide sections defining a longitudinal axis and including a first waveguide section and a last waveguide section and being arranged in succession from said first waveguide section to said last waveguide section; and

lever means for allowing said waveguide sections to be rotated relative to each other, said lever means including a lever externally supported on each of said waveguide sections arranged between said first waveguide section and said last waveguide section and being rotatable about an axis perpendicular to said longitudinal axis, said lever having two axial ends engaging in a groove of adjoining waveguide sections for longitudinal displacement, with said groove extending parallel to said longitudinal axis.

4,875,028

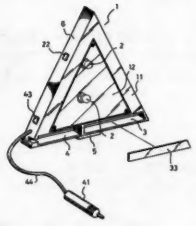
WARNING TRIANGLE

An-Chuan Chou, No. 12, Yung An St., Tainan, Taiwan

Filed Mar. 19, 1986, Ser. No. 841,205

Int. Cl.[4] B60Q *1/00*

U.S. Cl. 340—473 1 Claim



1. A warning triangle 1, comprising a triangle structure with an open side, said triangle structure having a lower portion wherein there is formed a plug storage chamber, a battery chamber, and a securable cover hinged to the battery chamber;

an extension cord connected at one end to an interior wall of said triangle structure;

an adapter plug connected to the other end of said extension cord;

an outer triangular plate mounted on the open side of said triangle structure, said outer triangular plate having a triangular opening at the central part thereof;

an inner triangular plate mounted on the triangular opening of said outer triangular plate, said inner triangular plate being translucent in color;

spring means disposed within said triangle structure coupled to said extension cord for retraction and winding thereof;

an automatic winding switch mounted on said triangle structure for securing a predetermined length of said extension cord while in use;

a plurality of light bulbs switchably coupled to a power source, said light bulbs disposed within said triangle structure for illumination of said inner triangular plate;

means for controlling said light bulbs to give continuous or blinking light; and,

magnets provided on bottom and back sides of said triangle structure for allowing said warning triangle to be conveniently secured on any metal part of a vehicle.

4,875,029

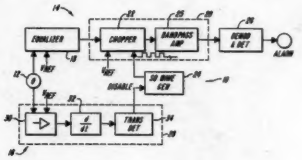
SUPPRESSED TRANSIENT UNIFORM DETECTION SENSITIVITY PIR DETECTOR

John K. Guscott, Lynnfield; Gerard G. Stelmack, Newton, and Charles A. Boulos, Milford, all of Mass., assignors to Aritech Corporation, Framingham, Mass.

Filed Dec. 30, 1987, Ser. No. 139,652

Int. Cl.[4] G08B *13/18*

U.S. Cl. 340—567 11 Claims



1. A uniform-detection-sensitivity passive infrared detector, comprising:

infrared sensor means for providing a target detection signal having an amplitude that diminishes with increasing target velocity over a range of detectable target velocities,

said infrared sensor means including a pyroelectric detector; and

equalizer means coupled to the infrared sensor means for increasingly boosting the amplitude of the target detection signal with increasing target velocity so as to provide a target-velocity-compensated signal that is substantially flat over the range of detectable target velocities;

said equalizer means including an analog passive network having a resistor capacitor network.

4,875,030

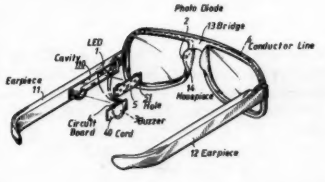
SLEEP-PREVENTING ALARM DEVICE

Shui W. Chiu, 3 Fl., No. 30, Lane 60, Swang Yuan St., Taipei, Taiwan

Filed Mar. 13, 1989, Ser. No. 322,109

Int. Cl.[4] G08B *23/00*

U.S. Cl. 340—575 1 Claim



1. A sleep-preventing alarm device incorporated within a

pair of glasses comprising a light emitting diode, a photo diode, a buzzer, a power source and a printed circuit board electrically connected to said light emitting diode, said photo diode and said buzzer;

said photo diode being lodged in a bridge of said glasses with a capsule portion of said photo diode protruding from a nosepiece of said glasses;

an earpiece of said glasses having a cavity to receive said printed circuit board and said light emitting diode therein; an opening of said cavity being covered by a cover and a plate; and

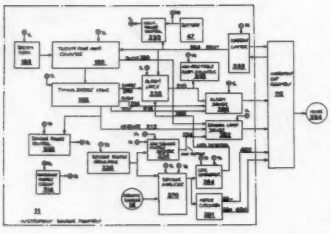
said printed circuit board being fixedly mounted on said cover; said plate having a plurality of holes to receive said light emitting diode, said holes being oriented at a slant to said plate in a direction of said photo diode.

4,875,031

VAPOR MONITORING SYSTEM

Ernest A. Filippi, P.O. Box 1809, Porterville, Calif. 93258, and Kenneth L. Miller, 22209 Halldale Ave., Torrance, Calif. 90501

Filed Dec. 18, 1987, Ser. No. 134,866
Int. Cl.[4] G01B *21/00*
U.S. Cl. 340—605 **19 Claims**



1. Apparatus for detecting hazardous gases comprising:

a pressure containment housing adapted to be placed in a well or conduit to a predetermined depth below ground level;

an instrument head;

an electrical cable coupling the instrument head to the pressure containment housing, said cable having a length sufficient to allow the instrument head to be located near the top of the well or conduit when the pressure containment housing is in the well or conduit at said predetermined depth below ground level;

an actuatable signalling means within the instrument head;

a gas sensor carried by the housing for sensing the presence of hazardous gases in the well or conduit at said predetermined depth below ground level;

a portable power unit carried by the housing and coupled with the gas sensor and the signalling element by way of said electrical cable to actuate the signalling means when power is supplied by the power unit to the gas sensor; and

timing means carried bv the housing and coupled with the power unit to supply electrical power to the gas sensor and the signalling means periodically.

4,875,032

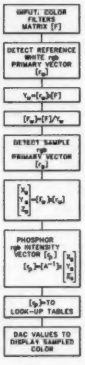
METHOD AND APPARATUS FOR PROCESSING COLORIMETRIC PARAMETERS OF A COLOR SAMPLE

Paul A. McManus, 240 N.W. Gleneagle Dr., Sherwood, Oreg. 97140, and Robert J. Beaton, 12905 S.W. Rita Dr., Beaverton, Oreg. 97005

Filed Oct. 26, 1987, Ser. No. 113,022
Int. Cl.[4] G09G *1/28*
U.S. Cl. 340—703 **4 Claims**

1. A method for processing colorimetric parameters of a color sample for reproducing the color of the sample on a video monitor screen, wherein the color sample is illuminated by a reference light having tristimulus values and is definable by a primary intensity vector denoting relative first color, second color and third color luminous intensity levels of the illuminated color sample, and wherein the video monitor includes a plurality of phosphor sets, the luminous intensity of the phosphor sets being variable to produce colors on the monitor screen, any particular color produced on the monitor screen being definablè by a phosphor intensity vector that denotes the relative values of the luminous intensity levels of the phosphor sets at the time the particular color is produced on the monitor screen, the method comprising the steps of:

(a) directing through each of three color filters a source light having tristimulus values representing a standard CIE


INPUT: COLOR FILTERS MATRIX [F]
DETECT REFERENCE WHITE FOR PRIMARY VECTOR
DETECT SAMPLE FOR PRIMARY VECTOR
PHOSPHOR FOR INTENSITY VECTOR
TO LOOK-UP TABLES
DAC VALUES TO DISPLAY SAMPLED COLOR

illuminant, and generating a color filters matrix representative of the relative intensity contributions of each filter color to the tristimulus values of the source light;

(b) directing the reference light through each of the color filters, and generating a reference primary vector representative of the relative primary intensity contribution of each filter color to the reference light;

(c) weighting the color filters matrix to reflect the differences between the tristimulus values of the source light and the tristimulus values of the reference light;

(d)detecting the primary intensity vector of the color sample; and

(e) multiplying the detected primary intensity vector of the color sample and the weighted color filters matrix to generate the tristimulus values of the color sample.

4,875,033

GRAPHICS INPUT APPARATUS

Kiyotaka Kato, and Michitaka Oshima, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 2, 1987, Ser. No. 57,032
Claims priority, application Japan, Jun. 5, 1986, 61-129197; Jun. 5, 1986, 61-129198
Int. Cl.[4] G09G *1/00*
U.S. Cl. 340—706 **27 Claims**

1. A graphics input apparatus, which includes:

memory means;

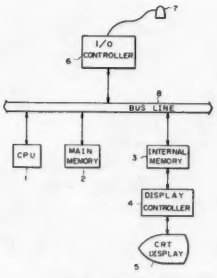
display device means capable of displaying a figure in a picture plane having m×N pixels;

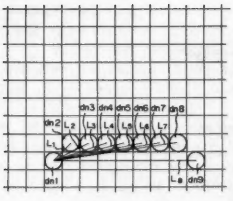
positions indicating means for indicating predetermined positions in the picture plane of said display device means;

cursor displaying means for displaying a cursor at the positions indicated by said position indicating means;

element inputting means for executing a first step of displaying at the display position of said cursor a starting point of

elements forming the figure to be drawn in the picture plane of said display device means as a starting node, a second step of storing in said memory means a node number of a node if the numbered node is present in the vicinity of the starting node, or of assigning a specified node number to a node if there are no nodes already numbered present in the vicinity of the starting node and storing the specified node number in said memory means, a third step of displaying pixels at the display positions of said cursor indicated by said position indicating means from the position of the starting node as an element, a fourth step of displaying an ending point of the element at the display position of said cursor as an ending node, a fifth step of storing a node number of a node if the numbered node is present in the vicinity of the ending node, and of assigning and storing a specified node number to a node if there are no nodes already numbered present in the vicinity of the ending node, and a sixth step of storing information between the starting node and the ending node; and





shape recognition means for recognizing the shape of the element is a predetermined manner.

4,875,034

STEREOSCOPIC GRAPHICS DISPLAY SYSTEM WITH MULTIPLE WINDOWS FOR DISPLAYING MULTIPLE IMAGES

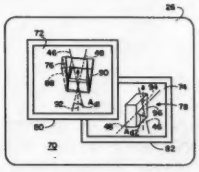
Daniel A. Brokenshire, 3413 SW. Dickinson St., Portland, Oreg. 97219

Filed Feb. 8, 1988, Ser. No. 153,116
Int. Cl.[4] G09G *1/06*
U.S. Cl. 340—721 **8 Claims**

1. In a stereoscopic graphics display system having a display screen upon which an image is formed in accordance with stereoscopic image data representing right- and left-eye views differing by a preselected amount of binocular disparity that is established by a binocular viewing model, a method of forming on the display screen plural windows within which plural images are formed, comprising:

designating for each one of the windows a corresponding region of the display screen, each region including a marginal peripheral portion;

assigning to each window a first binocular viewing model by which images are rendered within the region corresponding to the window and a second binocular viewing model by which a border is rendered with zero binocular disparity within the marginal peripheral portion; and



rendering within the marginal peripheral portions of the regions borders that represent outlines of the corresponding windows,

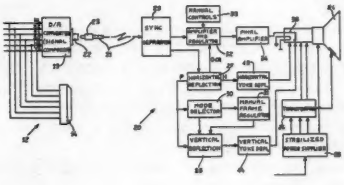
whereby each border is rendered with zero disparity and the stereoscopic graphics display system is capable of rendering the right- and left-eye views of a stereoscopic image within each of the plural windows in accordance with the first binocular viewing model assigned to the window.

4,875,035

ARRANGEMENT FOR THE DISPLAY OF PROCESSING DATA BY MEANS OF PIXELS ON A CATHODE RAY TUBE

Franco Furno, Zimone, and Luigi Biondi, San Martino Canavese, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Feb. 29, 1988, Ser. No. 162,252
Claims priority, application Italy, Mar. 31, 1987, 67248 A/87
Int. Cl.[4] G09G *1/16*
U.S. Cl. 340—731 **5 Claims**



1. Arrangement for the display of processing data by means of pixels on a cathode ray tube—CRT—comprising a circuit for control of the CRT including means for horizontal and vertical deflection of the signal of the pixel on the tube to provide for scanning of the CRT and comprising a control means operable to generate a plurality of first logic signals which define the pixel to be displayed, the control means including means operable to generate at least two further logic signals which define synchronization of the first logical signals with scanning of the tube effected by the deflection means, and a signal composer circuit operable to combine the first logic signals into a single control signal, characterized in that the composer circuit is operable to combine in the control signal also the further logic signals to create a single composite signal, a synchronization separator circuit being provided for separating the synchronization signals from the composite signal, for controlling the deflection means, wherein the display may be produced in accordance with at least two different resolution formats, characterized in that the separator circuit is operable to control format selection means in such a way as to control

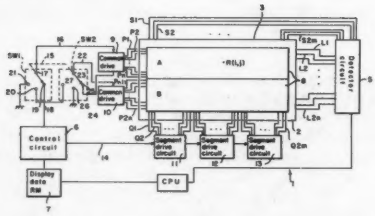
deflection of the pixel signal on the tube in accordance with the selected format.

4,875,036

LIQUID CRYSTAL DISPLAY DEVICE FOR BOTH INPUTTING AND OUTPUTTING INFORMATION

Isamu Washizuka, Kyoto; Yukihiro Inoue, Kashihara, and Yoshio Okajima, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 778,006, Sep. 20, 1985, abandoned. This application Apr. 18, 1988, Ser. No. 185,281
Claims priority, application Japan, Sep. 22, 1984, 59-199291
Int. Cl.[4] G09G *3/36*
U.S. Cl. 340—784 **10 Claims**



1. A system for introducing and displaying information comprising:

a flat panel matrix display unit having a plurality of pixels arranged in a matrix, each of said pixels associated with one of a plurality of common row electrodes, N;

input means for introducing the information into the system;

said input means including a plurality of information receiving elements each corresponding to an individual pixel of said flat panel matrix display;

said input means detecting a portion of said flat panel matrix display unit being inputted upon;

common drive means, responsive to said input means, for sequentially scanning said common row electrodes of said matrix display unit with scan voltage pulses;

said common row electrodes being divided into K common row electrode groups each having N/K common row electrodes and defining a display portion,

said common drive means sequentially scanning said common row electrodes of at least one of said common row electrode groups to display the information introduced by said input means thereon;

said common drive means driving said common row electrodes of said portion detected by said input means with a common electrode scan voltage pulse which has a higher duty cycle than the duty cycle 1/N needed to scan all N common row electrodes to improve contrast of the displayed information, thereby operating the system in a partial display mode; and

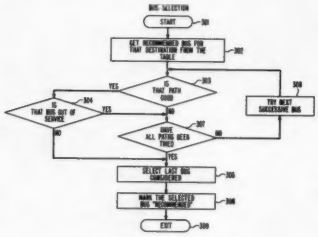
said common drive means driving said common row electrodes with a common electrode scan voltage pulse which has a duty cycle of 1/N when the system is operable in a fully display mode.

4,875,037

AUTOMATIC REROUTING OF CALLS THROUGH DATA BUSES

Carlos Escolar, East Windsor, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 437,814, Oct. 29, 1982, abandoned. This application Aug. 12, 1985, Ser. No. 764,775
Int. Cl.[4] H04Q *1/00*
U.S. Cl. 340—825.01 **7 Claims**



1. in a communication system having a communicating source entity, at least two communicating destination entities and at least two buses, each bus interconnecting in parallel the three communicating entities for delivering data communications from the source to the destination entities, a method for enabling the source entity to select buses to deliver the data communications, comprising the steps of:

directing an initial communication to be delivered to any one of the destination entities over only a selected one of the buses; and

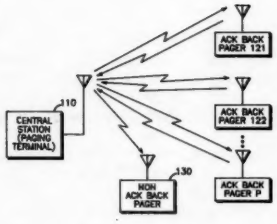
directing subsequent communications to be delivered to the one destination entity over only another one of the buses while still directing subsequent communications to be delivered to other ones of the destination entities only over the selected one bus when delivery of the initial communication fails.

4,875,038

FREQUENCY DIVISION MULTIPLEXED ACKNOWLEDGE BACK PAGING SYSTEM

Kazimierz Siwiak, Coral Springs; Leon Jasinski, Fort Lauderdale, and Francis R. Steel, Parkland, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 7, 1988, Ser. No. 141,654
Int. Cl.[4] H04Q *9/00*
U.S. Cl. 340—825.44 **21 Claims**



1. An acknowledge back pager having a unique address associated therewith, said pager comprising;

receiving means for receiving paging signals from a central station, said paging signals including a batch of M pager addresses transmitted in a sequential order during a first

time frame, wherein M is the number of pager addresses in said batch;

decoding means, coupled to said receiving means, for detecting the presence of said pager's address within said batch of M addresses

address order determining means, coupled to said decoding means, for determining the order of said pager,s address within said batch of M addresses

sub-band transmitting means for transmitting an acknowledge back signal on a selected one of a plurality of M predetermined frequency sub-bands, said selected one of said sub-bands exhibiting a predetermined relationship to the order of the address of said pager within said batch of M addresses.

4,875,039

PAGING SYSTEM WITH TRANSMISSION PROTOCOL COMPATIBLE WITH ANALOG AND DIGITAL TRANSMITTERS

Andrew A. Andros, Spring, Tex.; Thomas J. Campana, Jr., Chicago, Ill.; Gary F. Thelen, Palos Park, Ill., and Robert A. Kinast, Chicago, Ill., assignors to Telefind Corp., Miami, Fla.

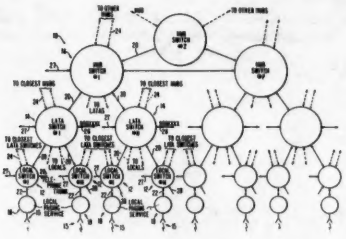
Filed Feb. 22, 1988, Ser. No. 158,981

Int. Cl.[4] H04Q *7/00*; H03C *3/08*

U.S. Cl. 340—825.440 **26 Claims**

MICROFICHE APPENDIX INCLUDED

(276 Microfiche, 3 Pages)



1. A paging system comprising:

(a) a transmitter for transmitting pages which are comprised of characters with the characters of each page modulating a carrier which is broadcast by the transmitter, the transmitter utilizing one of an analog transmission protocol or a digital transmission protocol to transmit other pages and a transmission protocol different from the analog or digital transmission protocol but compatible with the transmitter being used to transmit other pages with the analog or digital transmission protocols;

(b) means for receiving pages to be broadcast by the transmitter;

(c) a memory, coupled to the means for receiving, for storing the received pages to be broadcast; and

(d) control means, coupled to the memory and to the transmitter, for encoding each character of each page with the different transmission protocol by utilizing a plurality of frequencies each encoding a different value with each character being encoded with at least one value and for providing the encoded characters in a page to the transmitter for broadcast by the transmitter.

4,875,040

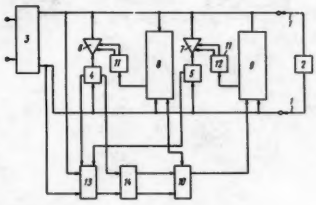
DEVICE FOR REMOTE CONTROL OF ELECTRICAL APPARATUS

Vitaly S. Dzjuban, ulitsa 50-letia SSSR, 37, kv. 41; Alexandr D. Sazhin, ulitsa Gertsena, 38, kv. 44; Valery K. Zhitnikov, ulitsa 50-letia SSSR, 143A, kv. 28, and Anatoly I. Konoplyanko, ulitsa Schetinina, 17, kv. 179, all of Donetsk, U.S.S.R.

Filed May 6, 1988, Ser. No. 190,771

Int. Cl.[4] H04Q *9/00*

U.S. Cl. 340—825.060 **4 Claims**



1. A device for remote control of an electrical apparatus, comprising:

a communication line leading to a control desk;

a power supply connected to said communication line for supplying a communication signal thereon

a first signalling means for signalling that said communication line is in operation mode, said signalling means having an input coupled to said power supply;

a first current amplifier coupled between an output of said first signalling means and said communication line;

a first current comparison means coupled to said communication line and to a control input of said first current amplifier for comparing a current flow on said communication line in one direction with a current flow in an opposite direction for determining that said communication line is in said operation mode and for providing a first control signal to said first current amplifier, said first current amplifier operating said first signalling means into a first mode indicating that said communication line in said operation mode;

a first interference suppression means coupled between said first current comparison means and said first current amplifier for suppressing signals coupled to said first current comparison means from said communication line other than said communication signal;

a second signalling means for signalling that said communication line is in said operation mode, said second signalling means having an input coupled to said power supply;

a second current amplifier coupled between an output of said second signalling means and said communication line;

a second current comparison means coupled to said communication line and to a control input of said second current amplifier for comparing a current flow on said communication line in one direction with a current flow in an opposite direction for determining that said communicating line is in said operation mode and for providing a second control signal to said second current amplifier, said second current amplifier operating said second signalling means into a first mode indicating that said communication line is in said operation mode;

a second interference suppression means coupled between said current comparison means and said second current amplifier for suppressing signals coupled to said second current comparison means from said communication line other than said communication signal;

a logic circuit means coupled to an output of said first and said second signalling means and being coupled to said power supply for determining that said first and said second signalling means are in said first mode;

actuating means coupled to an output of said logic circuit

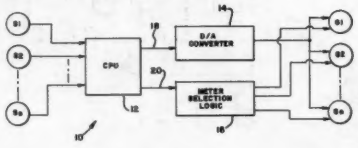
means and an output of said first signalling means for actuating said electrical apparatus when said first and said second signalling means are in said first mode.

4,875,041

TIME MULTIPLEXED CONTROL OF AIR CORE GAUGES FROM A MICROPROCESSOR ADDRESS/DATA BUS

Robert D. Dannenberg, Fort Wayne, Ind., assignor to Navistar International Transportation Corp., Chicago, Ill.

Filed Nov. 21, 1988, Ser. No. 274,094
Int. Cl.[4] H04Q *9/00*
U.S. Cl. 340—870.13 **7 Claims**



1. In an instrumentation system in which data representing the values of various parameters of interest is presented to a central processing unit (CPU), and the CPU processes the data presented to it and in turn intermittently presents the data for each parameter of interest as a multi-bit value on a multi-bit digital data bus, the improvement for displaying the data for each parameter of interest via the air core meter movement of a corresponding gauge by addressing each gauge via an address bus when data for the gauge is present on the data bus, said improvement comprising:

(a) a digital-to-analog converter circuit that is shared by all gauges, said digital-to-analog converter circuit having an input and an output, the input of said digital-to-analog converter circuit being coupled to the data bus;

(b) gauge selection means having an input coupled to the address bus and a plurality of outputs each of which is connected to a corresponding gauge, said gauge selection means comprising means for selectively activating its outputs in accordance with addresses supplied to it via the address bus so as to enable each gauge to be selectively activated to receive data;

(c) each gauge comprising a sample and hold circuit having a first input coupled to the digital-to-analog converter circuit output and a second input coupled to a particular one of the gauge selection means outputs, each sample and hold circuit comprising means for causing the signal at its first input to be sampled and to be held at an output thereof when its second input is activated by said gauge selection means; and

(d) each gauge further comprising a driver circuit having an input that is coupled to the output of its sample and hold circuit and an output by which the movement of its air core meter is operated.

4,875,042

MULTI CHANNEL TEMPERATURE CONTROLLER UTILIZING ELECTRONIC MULTIPLEXER

Seiji Oku, Mishima; Tooru Shimamura, Muko; Kazutomo Naganawa, Suita, and Toshiya Tanamura, Nagaokakyo, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

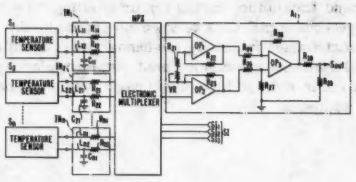
Filed Jan. 12, 1987, Ser. No. 2,328
Claims priority, application Japan, Jan. 10, 1986, 61-2160[U]; Jan. 13, 1986, 61-3184[U]
Int. Cl.[4] G08C *19/30*
U.S. Cl. 340—870.170 **5 Claims**

1. A multi channel temperature controller, comprising:

a plurality of temperature sensors producing a plurality of output signals;

a selection means for providing a plurality of selection signals;

an electronic multiplexer which receives said plurality of output signals from said plurality of temperature sensors and from said selection means, said electronic multiplexer



sequentially supplying said signals to its output according to at least one of said selection signals;

a plurality of input circuits, one interposed between said electronic multiplexer and each of said temperature sensors for removing noise from said output signals; and;

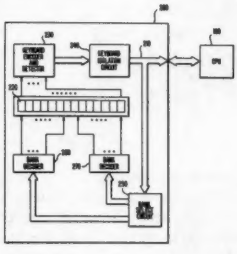
an amplifier which receives said output of said electronic multiplexer.

4,875,043

BI-DIRECTIONAL KEYBOARD INTERFACE CIRCUIT

Gregory A. Gisoni, Murrysville, and James M. Forker, Monroeville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 812,214, Dec. 23, 1985, abandoned. This application Feb. 8, 1988, Ser. No. 154,430
Int. Cl.[4] H03M *11/00*
U.S. Cl. 341—22 **12 Claims**



1. A keyboard and interface circuit connectable to a computer, said circuit comprising:

a keyboard having keys and lights corresponding to the keys;

encoder and detection means for detecting key selection and producing a key code corresponding to a selected key;

a parallel bi-directional interface bus, having one set of bi-directional lines where all lines are bi-directional, for both transferring the key code to the computer and transferring a first light selection code corresponding to the key code from the computer;

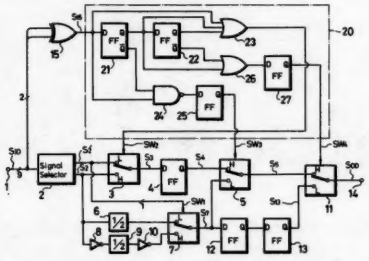
isolation means for isolating said encoder and detection means from said bi-directional bus; and

decoder means for decoding the first light code and activating the light corresponding to the selected key.

4,875,044
DIGITAL LIMITING CIRCUIT

Yoshiyuki Ohta, and Taku Kihara, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 1, 1987, Ser. No. 127,279
Claims priority, application Japan, Dec. 9, 1986, 61-293277; Mar. 13, 1987, 62-058216
Int. Cl.[4] H03M 7/30
U.S. Cl. 341—87 **7 Claims**



1. A digital limiting circuit for limiting an input digital signal with n+1 bits, where n is a positive integer, so that an output digital signal with n bits is generated, said limiting circuit comprising:

an input terminal supplied with the input digital signal with n+1 bits;

digital signal level detecting means supplied with the most significant bit and the second most significant bit of said input digital signal for detecting whether the level L of said input digital signal is within the range

$$2^n \leq L < 2^{n+1} + 2^n;$$

switching signal generating means supplied with the output of said signal level detecting means for generating a switching signal;

digital signal converting means for converting said input digital signal with n+1 bits into a converted digital signal with n bits;

modified signal generating means for generating a modified signal composed of a digital signal having an extreme value of an n bit digital signal and a digital signal having the average value of said extreme value and said converted digital signal, where said extreme value is the lowest or highest value or to be represented in said output signal; and

selecting means controlled by said switching signal and for selecting said modified signal or said converted digital signal, whereby said output digital signal with n bits is obtained from said selecting means.

4,875,045
VARIABLE GAIN ENCODER APPARATUS AND METHOD

David L. Lynch, Kanata, and Guy C. Quesnel, Nepean, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

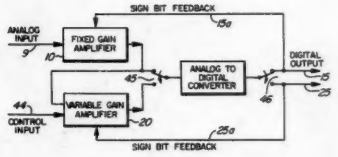
Filed Mar. 9, 1988, Ser. No. 165,851
Int. Cl.[4] H03M 1/18
U.S. Cl. 341—139 **18 Claims**

1. A gain controllable analog to digital (A/D) encoder for providing digital words being representative of samples of an input analog signal, comprising:

an analog to digital converter circuit for generating said digital words each consisting of plural bits, including a sign bit;

a first means for generating a fixed gain analog signal in response to the input analog signal, the first means being mid-operating point stabilized in response to the sign bits corresponding to the fixed gain analog signal; and

a second means for supplying a variably controlled gain

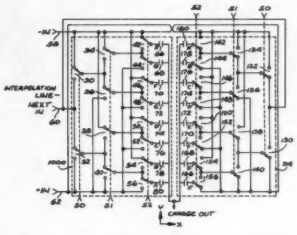


analog signal to the converter circuit in response to the stabilized mid-operating point fixed gain analog signal from the first means, the variably controlled gain analog signal from the second means being mid-operating point stabilized in response to the sign bits of the digital words.

4,875,046
CENTROIDING ALGORITHM FOR NETWORKS USED IN A/D AND D/A CONVERTERS

Lanny L. Lewyn, Laguna Beach, Calif., assignor to Brooktree Corporation, San Diego, Calif.

Filed Jul. 11, 1986, Ser. No. 884,472
Int. Cl.[4] H03M 1/76
U.S. Cl. 341—148 **32 Claims**



1. In combination for converting a binary coded value into an analog value,

means for providing a plurality of signals each having first and second logic levels coding for binary values of "1" and "0" and each identifying a binary value of an individual binary significance, the signals in the plurality cumulatively coding for the analog value,

an integrated circuit chip,

means disposed on the integrated circuit chip for decoding the logic levels of the binary signals in the plurality,

a plurality of output means each disposed on the chip at an individual position in a first direction relative to a centroid position to produce an output signal having characteristics dependent upon such individual disposition, each of the output means in the plurality being operatively coupled to the decoding means to provide the output signal for an individual one of the analog values and for all analog values less than such individual analog value, and

means disposed on the integrated circuit chip for producing additional signals each having characteristics corresponding substantially to the characteristics of the signal from an individual one of the output means in the plurality but offsetting the characteristics produced in the output signal, from such individual one of the output means as a result of the disposition of such individual one of the output means in the plurality at the individual position in

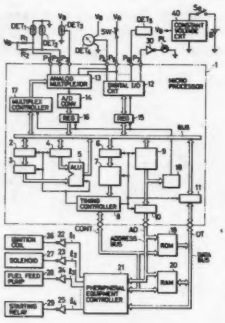
the first direction relative to the centroid position, to obtain the production of signals, for each of the analog values coded by the logic levels of the binary signals, corresponding to that which would be obtained for a disposition of each of the output means in the plurality of the centroid position in the first direction.

4,875,047

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE HAVING A WIRING LAYOUT TO AVOID INTERSECTING BETWEEN ANALOG SIGNAL WIRING LAYERS AND DIGITAL SIGNAL WIRING LAYERS

Shiro Baba, Tokorozawa, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 21, 1982, Ser. No. 420,877
Claims priority, application Japan, Sep. 21, 1981, 147894
Int. Cl.[4] H03K *13/20*
U.S. Cl. 341—155 **15 Claims**



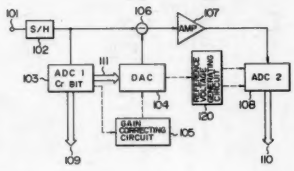
1. A semiconductor integrated circuit device comprising:
an analog signal transmission link formed on a semiconductor substrate in a first prescribed geometrical pattern;
a first prescribed, analog signal-handling, electronic circuit formed on said substrate and coupled to said analog signal transmission link so that analog signals may be exchanged between said first prescribed circuit and said analog signal transmission link;
a digital signal transmission link comprising a plurality of digital signal conveying paths and formed on said substrate in a second prescribed geometrical pattern separated from said first prescribed geometrical pattern so as not to overlap said first pattern;
a second prescribed, digital signal-handling, electronic circuit formed on said substrate and coupled to said digital signal transmission link so that digital signals may be exchanged between said second prescribed circuit and said digital signal transmission link; and
a plurality of bonding pad electrodes arranged on said substrate at positions adjacent to and separating respective ones of said digital signal conveying paths from said analog signal transmission link,
wherein said plurality of bonding pad electrodes are arranged adjacent a peripheral portion of said substrate, and wherein said analog transmission link has a portion which is disposed along said peripheral portion of said substrate between an edge of said substrate and said bonding pad electrodes.

4,875,048

TWO-STEP PARALLEL ANALOG TO DIGITAL CONVERTER

Toshihiko Shimizu, Tokyo; Masao Hotta, Hanno, and Kenji Maio, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 29, 1988, Ser. No. 237,757
Claims priority, application Japan, Aug. 28, 1987, 62-212747
Int. Cl.[4] H03K *13/02;* H03M *1/36*
U.S. Cl. 341—156 **9 Claims**



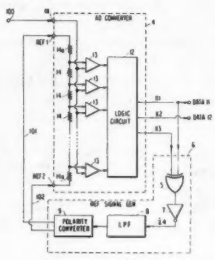
4. A two-step parallel analog to digital converter comprising:
a first flash-type A/D converter for subjecting an analog input to A/D conversion to determine upper significant bits;
a D/A converter for reconverting said upper significant bits output to an analog value;
a subtracting amplifier for amplifying a difference between the output of said D/A converter and said analog input;
a second flash-type A/D converter for subjecting the output of said subtracting amplifier to A/D conversion to determine lower significant bits;
a circuit for correcting a gain of said D/A converter; and
a circuit for generating references for said second flash-type A/D converter.

4,875,049

AUTOMATIC LEVEL CONTROL CIRCUIT FOR AN AD CONVERTOR

Yasuharu Yoshida, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 795,142, Nov. 5, 1985, abandoned. This application Feb. 11, 1988, Ser. No. 157,154
Claims priority, application Japan, Nov. 6, 1984, 59-233826
Int. Cl.[4] H03M *1/78*
U.S. Cl. 341—159 **12 Claims**



1. An automatic level control circuit for use in a multi-level signal transmission system comprising an analog-to-digital (A/D) converter for discriminating a demodulated multi-level baseband signal with respect to a plurality of reference levels to produce a plurality of decoded digital signals and an error digital signal, and a reference voltage generator, including logic circuit means, responsive to for providing a reference

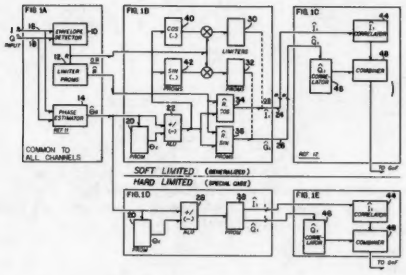
voltage to said A/D converter to uniformly shift said plurality of reference levels, said reference levels being controlled to optimum ones responsive to a variation in the level of said input signal.

4,875,050

GENERALIZED DOPPLER MATCHED BINARY PULSE COMPRESSOR

Dev D. Rathi, Los Angeles, Calif., assignor to ITT Gilfillan, a division of ITT Corporation, Van Nuys, Calif.

Filed Feb. 12, 1988, Ser. No. 155,423
Int. Cl.[4] G01S 7/32, 7/44; G06F 7/38
U.S. Cl. 342—195 **3 Claims**



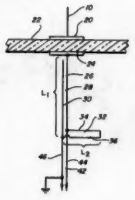
1. A doppler matched binary pulse compressor having means to initiate operation thereof; means to generate a doppler matched filter bank; means to compress the pulses from the doppler matched filter; means to estimate the input signal phase in real time including a phase estimator having a quadrant detector, means to scale the quadrature components while preserving the signal phase, means to reduce accuracy computations to 45° or less of the first quadrant, and means to reconstruct the phase to place the signal in the proper quadrant; and, means to select the overall optimal filter in real time.

4,875,051

ANTENNA WITH IMPEDANCE MATCHING MEMBER

Herbert R. Blaese, 3314 Olcott Ave., Chicago, Ill. 60634

Filed May 4, 1988, Ser. No. 190,001
Int. Cl.[4] H01Q 1/32
U.S. Cl. 343—715 **15 Claims**



1. An on-glass antenna for use with a desired frequency for connection to the window of a vehicle, which comprises:

a radiator for location on the outside of the vehicle window;

a first transfer member for fastening to the outside of the vehicle window;

means for connecting said radiator to said first transfer member;

a second transfer member for fastening to the inside of the vehicle window in substantial alignment with said first transfer member;

a cable for coupling said radiator to a transmitter/receiver, said cable comprising a first cable portion having a first end and a second end, and an impedance matching member;

said first cable portion including a first conductor and a spaced second conductor with said first and second conductors extending substantially from said first end of the first cable portion to said second end thereof;

means connecting said first conductor at said first end of said first cable portion to said second transfer member;

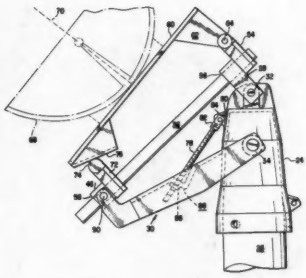
said impedance matching member comprising an electrical conductor bridging said first conductor to said second conductor of said first cable portion at said second end of said first cable portion, said impedance matching member and said first cable portion together having an electrical length of about ¼ wavelength with respect to said desired frequency.

4,875,052

ADJUSTABLE ORIENTATION APPARATUS WITH SIMULTANEOUS ADJUSTMENT OF POLAR AND DECLINATION ANGLES

Dean H. Anderson, and Mark M. Tomann, both of Garrison, N.Y., assignors to Hudson Valley Metal Works, Inc., Newburgh, N.Y.

Filed Jun. 16, 1986, Ser. No. 874,426
Int. Cl.[4] H01Q 1/12, 3/08
U.S. Cl. 343—882 **5 Claims**



1. An adjustable orientation apparatus, comprising:

first means to be oriented in accordance with a polar angle corresponding to the latitude of the geographical location of said apparatus, and a declination angle of an external object to be tracked by said apparatus;

base means;

second means comprising a polar axis shaft with a substantially, permanently fixed pivot casting and a first support arm, said second means orients said first means at said polar angle by said first support arm being pivotably secured to said base member at a first pivot point;

said first means pivotably connected to said pivot casting at a second pivot point;

third means comprising a sliding cam member and a cam plate, said cam plate secured to said first means, said cam member slidably received on said polar axis shaft at an end opposite said pivot casting, said third means orients said first means at said declination angle by pivotal movement of said first means about said second pivot point;

support means pivotably secured to said base means at a third pivot point and slidably received on said polar axis shaft adjacent said cam member;

manual angle adjustment means which permits adjustment of said polar angle and said declination angle by way of a single adjustment, said adjustment means interconnecting said base means and said support means; wherein,

said adjustment means causes said support means to pivot

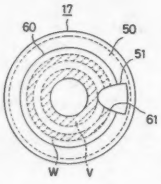
about said third pivot point and to slide along said polar axis shaft, said sliding in turn causes said cam member to slide along said polar axis shaft and said cam plate causing said first means to pivot about said second pivot point, said polar axis shaft pivoting about said first pivot point.

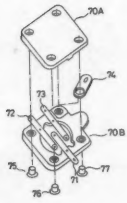
4,875,053

DRIVE CONTROL DEVICE FOR AN ELECTRICALLY-DRIVEN EXTENDING AND RETRACTING ANTENNA

Jiro Harada, Tokyo, Japan, assignor to Harada Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 22, 1988, Ser. No. 210,007
Claims priority, application Japan, Sep. 30, 1987, 62-244338
Int. Cl.[4] H01Q *1/10*
U.S. Cl. 343—903 **3 Claims**





1. A drive control device for an electrically driving an extending and retracting antenna system comprising:

a rotary plate continuously rotatable by rotation of a drive motor of said antenna via a reduction gear mechanism, said rotary plate rotating approximately once in the time required to complete extension or retraction of said antenna;

a washer-shaped conducting part attached to one side surface of said rotary plate, said conducting part having a small cut-out area formed in one part of its circumference which is non-conducting;

a first contact continuously in electrical contact with said conducting part;

a second contact provided such that said second contact is in continuous electrical contact with said conducting part until extension of said antenna is completed and when extesion of said antenna is completed, said second contact is in contact with said non-conducting small cut-out area and not in electrical contact with said conducting part; and

a third contact provided such that said third contact is in continuous electrical contact with said conducting part until retraction of said antenna is completed and when retraction said antenna is completed, said third contact is in contact with said non-conducting small cut-out area and not in electrical contact with said conducting part;

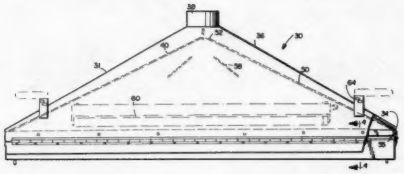
whereby said first and second contacts provide a limit switch for extension of said antenna and said first and third contacts provide a limit switch for retraction of said antenna.

4,875,054

CLEAN AIR HOOD FOR FLUID JET PRINTING

Timothy H. V. Archer, Centerville; Randy Bowman, Franklin, both of Ohio, and Michael I. Glenn, Burlington, N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Filed May 27, 1987, Ser. No. 54,490
Int. Cl.[4] G01D *15/18*; B05B *5/02*
U.S. Cl. 346—1.1 **22 Claims**



1. Apparatus for providing a curtain of air about the elongated print head of a fluid jet printer comprising:

a hood having an elongated opening at one end thereof in opposition to and spaced above the print head;

said hood having an air inlet; and

means carried by said hood for directing air from said inlet for exit through said opening along one side of said hood to form an elongated air curtain along the corresponding side of the print head;

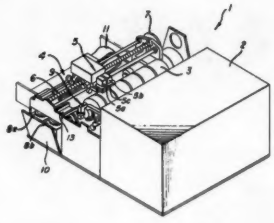
said hood having opposed spaced side walls, said directing means including a pair of baffles carried within said hood and respectively spaced from the opposed side walls, said baffles and corresponding side walls terminating in discrete air outlets adjacent opposite sides of said opening to form a pair of discrete, laterally spaced, air curtains issuing from opposite sides of the hood, respectively.

4,875,055

SIMPLIFIED MULTICOLOR FLUID SYSTEM FOR CONTINUOUS INK JET PRINTER

James D. McCann, Waynesville, Ohio; Lawrence R. Young, West Lebanon, N.H., and John M. Brandon, Dayton, Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 21, 1988, Ser. No. 273,549
Int. Cl.[4] G01D *15/18*
U.S. Cl. 346—75 **4 Claims**



1. In continuous ink jet printing system of the kind having a housing means forming a chamber for receiving a plurality of ink cartridges, a plurality of ink supply means for delivering ink to respective print heads from said cartridges and a plurality of ink return means for returning ink respectively from said print head to said cartridges, the improvement wherein:

(a) said ink cartridges have a vent opening to said cartridge interior;

(b) said cartridge housing is substantially air-tight and includes means for evacuating said chamber.

4,875,056

THERMAL RECORDING APPARATUS WITH VARIABLY CONTROLLED ENERGIZATION OF THE HEATING ELEMENTS THEREOF

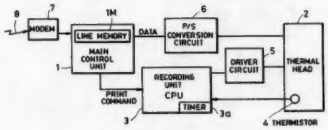
Takeshi Ono, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 12, 1987, Ser. No. 2,204

Claims priority, application Japan, Jan. 17, 1986, 61-6348; Jan. 30, 1986, 61-16752

Int. Cl.[4] G01D *15/10*; B41J *3/20*

U.S. Cl. 346—76 PH **12 Claims**



1. A thermal recording apparatus for recording on a recording medium, the apparatus comprising:

a recording head having a plurality of heating elements, provided as a plurality of individually controllable blocks, for recording on the recording medium when selected said heating elements are energized during recording cycles;

determining means for respectively determining the number of heating elements selected for energization in each of said blocks in the recording cycle; and

control means for variably and respectively controlling the amount of energy supplied to said selected heating elements in each of said blocks in accordance with the number of said heating elements determined by said determining means.

4,875,057

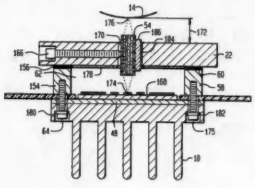
MODULAR OPTICAL PRINTHEAD FOR HARD COPY PRINTERS

Edwin A. Hediger, Fairport; Yee S. Ng, Fairmont, and Hieu Pham, Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 1, 1988, Ser. No. 239,564

Int. Cl.[4] G01D *15/14*, *9/42*

U.S. Cl. 346—107 R **12 Claims**



1. A modular printhead assembly for selectively exposing a moving photosensitive surface to provide a latent image, said printhead comprising:

a circuit arrangement including a linear array of light emitting diodes (LED's) which extend along a first axis;

a rigid heat sink to which the LED circuit arrangement is connected;

a linear optical lens;

a lens supporting structure non-adjustably attached to said heat sink to form an integral lens-LED combination;

adjustable means for securing the lens to the supporting structure after the lens has been aligned; and

a printed circuit board (PCB) positioned substantially between the heat sink and the supporting structure;

said lens supporting structure also providing means for mounting and registering the aligned printhead in associated apparatus, with said registration allowing the aligned printhead assembly to be interchanged between different apparatus without realignment of the lens.

4,875,058

VALVE DEVICE FOR A MATRIX PRINTER

Jiri Vonasek, Kungälv, Sweden, assignor to Markpoint System AB, Gothenburg, Sweden

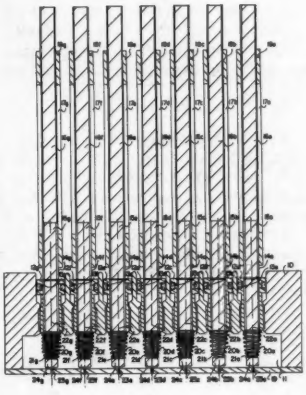
Filed Dec. 9, 1987, Ser. No. 130,531

Claims priority, application Sweden, Dec. 12, 1986, 86 05348; Nov. 25, 1987, 87 04675

The portion of the term of this patent subsequent to Apr. 12, 2005, has been disclaimed.

Int. Cl.[4] G01D *15/16*

U.S. Cl. 346—140 R **17 Claims**



1. In a device for providing liquid tight closure and opening, respectively, of a passage in a printer device for generating characters by the output of a certain amount of liquid for character recording, for instance ink, through the passage, comprising an armature provided with a valve body having a head portion in the passage, and means for a controlled armature reciprocating movement for obtaining said closure and opening operations, the improvement:

wherein the passage is formed in a plate-shaped, grindable element that is grindable to a smooth condition with a long term maintenance of the smoothness and generally free from internal strains, and

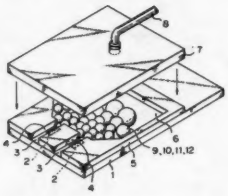
wherein the head portion has an at least partially smooth surface for direct abutment against the smooth grinded element, around the opening of the passage facing the armature.

4,875,059

WITH A LIQUID SUPPLY PATH HAVING DISPOSED THEREIN A FILLER PROVIDING PARTIAL FLOW BLOCKAGE THAT VARIES UPSTREAM OF THE DISCHARGE OREFICE

Kazuaki Masuda, Sagamihara, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 155,082, Feb. 11, 1988, abandoned. This application Feb. 12, 1988, Ser. No. 155,505
Claims priority, application Japan, Feb. 13, 1987, 62-029713
Int. Cl.[4] B01D *15/16;* B41J *3/04*
U.S. Cl. 346—140 R 15 Claims



1. An ink jet recording head having:

a liquid supply path communicating with a discharge port for providing for ink for discharge through said discharge port,

energy generating means provided correspondingly to said liquid supply path for generating energy to discharge the ink, and

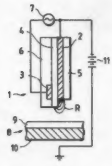
a filler disposed in said liquid supply path upstream of said energy generating means and partially blocking said liquid supply path so as to define a flow path having a varying percentage of voids, wherein said percentage of voids increases in the upstream direction of said liquid supply path.

4,875,060

DISCHARGE HEAD FOR AN ELECTROSTATIC RECORDING DEVICE

Koji Masuda; Yuji Suemitsu, and Kazuo Asano, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Nov. 25, 1988, Ser. No. 275,865
Claims priority, application Japan, Nov. 27, 1987, 62-297665
Int. Cl.[4] G01D *15/00*
U.S. Cl. 346—155 21 Claims



1. A discharge head for use in electrostatically recording an image on a recording body comprising:

a first insulation layer having a first side and a second side;

a plurality of discharge electrodes disposed on said first side of said first insulation layer, each of said electrodes having a tip end;

an induction electrode disposed on said second side of said first insulation layer; and

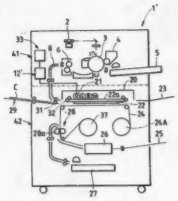
a second insulation layer disposed on said discharge electrodes to cover all but the tip ends of said discharge electrodes.

4,875,061

COLOR IMAGE RECORDING APPARATUS

Kouji Kobayakawa, Ichinomiya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Filed Mar. 22, 1989, Ser. No. 327,090
Claims priority, application Japan, Mar. 23, 1988, 63-38997[U]
Int. Cl.[4] G01D *15/00*
U.S. Cl. 346—157 6 Claims



1. A color image recording apparatus for recording an image on an image recording medium through an intermediate recording medium which carries an intermediate image which is one of a monochromatic color image or colored original image, said intermediate recording medium being supplyed from one of a monochromatic image forming unit and a manual insertion tray, said intermediate recording medium being superposed with said image recording medium at an exposure zone for light exposure for forming a latent image on said image recording medium; said apparatus comprising;

light source for irradiating one of red, green, blue and white light onto said image recording medium through said intermediate recording medium at said exposure zone;

a sheet deliverying and aligning means disposed upstream of said exposure zone for delivering aligned intermediate recording medium to said exposure zone, said delivering and aligning means being positioned downstream of said monochromatic image forming unit and said manual insertion tray;

color identification means disposed at a position adjacent said sheet deliverying and aligning means for identifying colors of said intermediate image, said identification means generating a signal indicative of said colors; and,

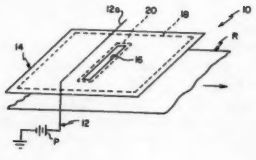
light selection means for automatically lighting one of said red, green, blue and white light in response to said signal.

4,875,062

ION PROJECTION PRINT HEAD

David M. Rakov, Irondequoit, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 27, 1988, Ser. No. 290,657
Int. Cl.[4] G01D *15/00*
U.S. Cl. 346—159 9 Claims



1. An ion projection print head for applying ions line-by-line from a substantially uniform linear ion source, in a modulated pattern to a moving ion receptor substrate to form a latent image charge pattern on such substrate corresponding to infor-

mation to be reproduced, said ion projection print head comprising:

a substantially planar mask having an elongated slot defined therethrough;

a continuous electrode formed on the side of said mask between said mask and said ion source;

a plurality of electrodes formed on the side of said mask opposite from said continuous electrode, said plurality of electrodes being spaced apart from one another and terminating at said slot; and

means for selectively applying an electrical bias to said plurality of electrodes respectively to modulate ion flow through said slot from the ion source to said receptor substrate.

4,875,063

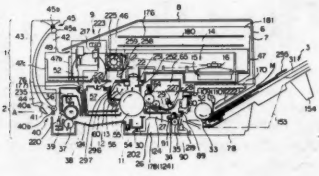
ELECTROSTATIC RECORDING APPARATUS

Hiroyuki Idenawa, Hiratsuka; Hideaki Mochimaru, Yokohama; Hajime Kanda; Nobuhiro Makita, both of Tokyo; Yoshiaki Tanaka, Kawasaki; Takahiro Yagisita, Yokohama; Takanori Yamaki, Tokyo; Takeshi Motohashi; Masayoshi Miyamoto, both of Yokohama; Hisao Ishizu, Tokyo; Yasuhiro Sagawa, Yamato; Tadaaki Kanno, Yokosuka; Tomoo Sankoda, Yamato; Hiroshi Hosokawa, Yokohama; Hideo Aoki, Yokohama; Takami Suzuki, Yokohama; Hiromi Takada, Yokohama, and Toshio Shimazaki, Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Sep. 1, 1987, Ser. No. 91,751

Int. Cl.[4] G01D *15/00*

U.S. Cl. 346—160.1 **11 Claims**



1. In an electrostatic recording apparatus having a casing in which various devices for executing an electrostatic recording process are accommodated, said apparatus capable of recording data in or on various kinds of transfer materials, said devices comprising at least a photoconductive element assembly and a developing assembly, said photoconductive element assembly comprising a photoconductive element, chargers, and a toner collecting tank, and said developing assembly comprising a developing roller which is detachable from said casing, a toner supply roller, a developing tank, a rotary shaft and connecting lever mounted on said rotary shaft of said developing roller for detachably connecting said developing roller to said casing while limiting up-down movement of said developing roller, and means for exerting a pressure force acting on said connecting lever during connection of said casing with said connecting lever, said pressure force changing to a weaker pressure force after said connection of said casing with said connecting lever is accomplished.

4,875,064

PROJECTOR APPARATUS WITH MIRROR MEANS

Osamu Umeda, Gifu; Tohru Nakakusu, Tokyo; Makoto Sato, Tokyo, and Tatsuo Shimazaki, Tokyo, all of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed Jul. 30, 1987, Ser. No. 79,883

Claims priority, application Japan, Aug. 6, 1986, 61-119814; Mar. 28, 1987, 62-46179; Jul. 3, 1987, 62-101814

Int. Cl.[4] G03B *21/10*

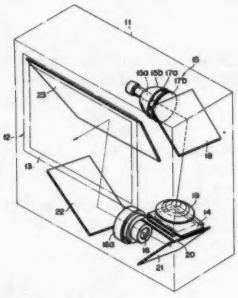
U.S. Cl. 353—78 **19 Claims**

1. A projector apparatus including, within a case having a display window equipped with a transmission type screen, a transmission type liquid crystal display panel, a light source means for illuminating said liquid crystal display panel from behind, and a projection lens means for projecting a display image of said liquid crystal display panel as an enlarged image on said transmission type screen, said projector apparatus comprising:

a first mirror means for reflecting light emitted from said light source to be incident substantially perpendicular to said liquid crystal display panel;

a focusing lens means for focusing light transmitted through said liquid crystal display panel onto said projection lens means;

a second mirror means for reflecting the focused light in the direction of an optical axis of said projection lens means to be incident on said projection lens means;



a third mirror means for reflecting the light projected from said projection lens means in a direction parallel to said transmission type screen;

a fourth mirror means for reflecting the light reflected by said third mirror means toward said transmission type screen; and

wherein a plane is defined by light reflected from the first mirror means to the second mirror means and on to the third mirror means, said first, second and third mirror means each bend light that is respectively incident thereon by 90°in said plane, and said fourth mirror means reflects light in a direction perpendicular to said plane.

4,875,065

CAMERA

Takayuki Kuboderа; Shizuo Nakamura; Masanori Onizawa; Hirotaka Shiroshita, all of Tokyo; Eiichi Mochizuki, Nagano; Masao Tsujimura; Toshikatsu Atsuta, both of Tokyo, and Takayoshi Morooka, Nagano, all of Japan, assignors to Kyocera Corporation, Kyoto, Japan

Filed Feb. 12, 1988, Ser. No. 155,316

Claims priority, application Japan, Feb. 13, 1987, 62-20529[U]; Jul. 29, 1987, 62-189173[U]

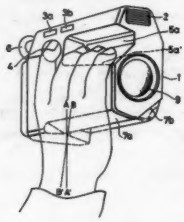
Int. Cl.[4] G03B *17/02*

U.S. Cl. 354—82 **4 Claims**

1. A camera comprising a camera body extended along the optical axis thereof, in which

said camera body has a recess at a position where at least one of the index, middle, ring and little fingers is placed when a person holds said camera body with the hand from

below and in which a camera bottom, which the palm touches when a person holds said camera body with the



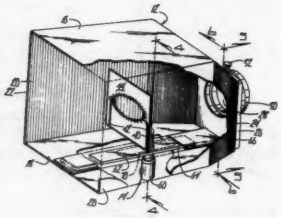
hand from below, had an inclined surface relatively small in width on a side of said camera body.

4,875,066

PHOTOGRAPHY SHADE AND VIGNETTER

Martin R. Rickard, N. Park Ave. Extension, Box C, New Sharon, Iowa 50207

Filed May 31, 1988, Ser. No. 200,560
Int. Cl.[4] G03B *11/00*
U.S. Cl. 354—296 16 Claims



1. A photographic shade and adjustable vignetter assembly comprising:

a shade having an open forward end, a rearward end, an upper wall, a lower wall, and opposite side walls, the walls being interconnected to form an enclosure,

attachment means on the rearward end of the shade for releasably attaching the shade to a camera lens;

a vignetter mounted within the shade enclosure for holding a vignette; and

mounting means for adjustably positioning the vignetter within the shade enclosure, the mounting means allowing forward, rearward, upward, downward and rotational movement of the vignetter within the shade enclosure and with respect to the lens.

4,875,067

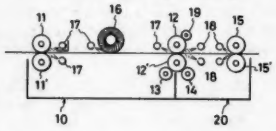
PROCESSING APPARATUS

Hisao Kanzaki, and Hisao Ohba, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Jul. 18, 1988, Ser. No. 220,252
Claims priority, application Japan, Jul. 23, 1987, 62-184371
Int. Cl.[4] G03B *5/04, 3/08*
U.S. Cl. 354—325 11 Claims

1. A conveying type apparatus for processing light-sensitive plates provided with at least two processing baths which comprises a roller type device for removing a processing solution from the plate processed, wherein said device comprises a pair of squeeze rollers and is disposed at the boundary between a preceding bath and an adjacent subsequent bath so as to separate the solutions in these baths from one another; and means for removing the processing solution on the roller surface;

wherein the means for removing a processing solution comprises a roller pressed against a lower roller of the paired



rollers and disposed on the side of the preceding bath, a roller pressed to the lower roller of the paired rollers and disposed on the side of the subsequent bath and a roller pressed to an upper roller of the paired rollers and disposed on the side of the subsequent bath.

4,875,068

INTEGRATED FUSER CONNECTOR AND ALIGNMENT MEMBER

Robert S. Pawlik, and Kenneth R. Rasch, both of Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jan. 25, 1988, Ser. No. 147,941
Int. Cl.[4] G03G *15/00;* H05B *01/00;* H01C *10/16*
U.S. Cl. 355—286 5 Claims

1. A fuser assembly in a printing machine comprising:

a molded, essentially rectangularly shaped housing having a plurality of integral posts disposed along a first surface of the housing,

an elongated flat, electrically conductive contact strip having at least one set of integral, oppositely disposed spring clips and a first and a second upright extending tab, the spring clips engaging opposite sides of one of said plurality of integral posts to secure the contact strip to the housing and align the contact strip within the housing,

a fuser roll with an associated electrical heating element disposed in proximity to the housing, one end of the heating element being secured to the distal end of the first upright extending tab, and

a thermo cutoff element, the thermo cutoff element being electrically connected to the heating element, one end of the thermo cutoff element being secured to the distal end of the second upright extending tab.

4,875,069

ANTI-FOULING DEVICE FOR SHEET GRIPPER

Yusaku Takada, Tokyo, and Kenji Takeda, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

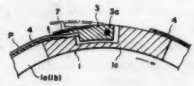
Continuation of Ser. No. 145,595, Jan. 19, 1988, abandoned. This application Nov. 14, 1988, Ser. No. 271,364
Claims priority, application Japan, Jan. 19, 1987, 62-008308; Jan. 19, 1987, 62-004950[U]
Int. Cl.[4] G03G *15/00*
U.S. Cl. 355—271 23 Claims

1. A transfer device for transferring a toner image onto a transfer material, comprising:

transfer material supporting means having a sheet-like material for supporting the transfer material and a supporting member for supporting the sheet-like material for movement along an endless path;

gripping means, mounted in an opening in said supporting

member for releasably gripping an end of the transfer material; and



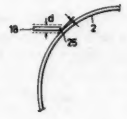
a sheet member mounted on said gripping means to cover at least a portion of said gripping means.

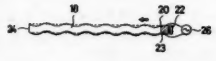
4,875,070

METHOD OF REMOVING TONER FROM A ROTATING DRUM IN A XEROGRAPHIC COPYING MACHINE USING A VIBRATING BLADE

Yutaka Hattori, Kamakura, Japan, assignor to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Filed Dec. 28, 1987, Ser. No. 138,082
Claims priority, application Japan, Dec. 30, 1986, 61-311727
Int. Cl.[4] G03G *21/00, 15/06*
U.S. Cl. 355—299 3 Claims





1. A method of removing a toner deposited on a rotating drum in a xerographic copying machine, comprising:

(a) positioning a blade having a scraping edge which is disposed closely adjacent the outer surface of the drum, the blade being defined by said scraping edge, an outer edge opposite said scraping edge and remote from the drum and two opposite end edges, the blade having a width extending between said scraping edge and said outer edge and a length extending between said end edges; and

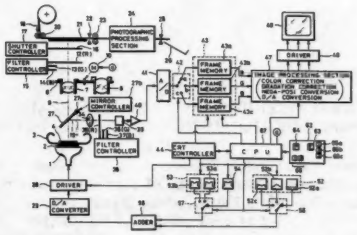
(b) imparting vibrations to the blade from one of said edges other than said scraping edge to produce non-standing vibration waves which run through the blade to bring said scraping edge alternately into and out of contact with the outer surface of the drum at short time intervals so as to remove toner therefrom.

4,875,071

SHADING CORRECTING APPARATUS FOR PHOTOGRAPHIC PRINTER

Kazuo Shiota, Kanagawa, Japan, assignor to Fuji Photo Film Co. Ltd., Kanagawa, Japan

Filed Jul. 13, 1988, Ser. No. 218,409
Claims priority, application Japan, Jul. 15, 1987, 62-176471; Jul. 31, 1987, 62-191687
Int. Cl.[4] G03B *27/72*
U.S. Cl. 355—20 9 Claims



1. A shading correcting apparatus for a photographic printer having a plurality of interchangeable printing lenses for printing an image of an original illuminated with a CRT on a photographic material, said shading correcting apparatus comprising:

memory means for memorizing data on illumination patterns of said CRT for each of said plurality of interchangeable printing lens;

means for selecting said data for one of said plurality of interchangeable printing lenses used, and

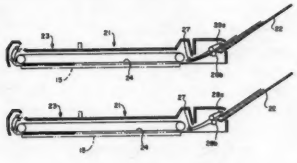
means for actuating said CRT to emit light so as to make an illumination pattern according to said selected data, thereby correcting shading produced due to said used printing lens.

4,875,072

AUTOMATIC DOCUMENT FEEDER

Kazuyuki Ohnishi, Nara; Yoshiteru Mori, Osaka, and Masakiyo Okuda, both of Osaka, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 2,808, Jan. 13, 1987, abandoned. This application May 26, 1988, Ser. No. 201,313
Claims priority, application Japan, Jan. 18, 1986, 61-9396
Int. Cl.[4] G03B *27/32, 27/52*
U.S. Cl. 355—23 3 Claims



1. In an automatic document feeder associated with an automatic two-side copying machine which operates selectably in a one-side copying mode wherein only one surface of an original document is scanned or a two-side copying mode wherein both surfaces of an original are successively scanned, said document feeder comprising a document table where a document is placed for copying, a tray means where documents to be copied are originally placed, said document table and said tray means defining a waiting position therebetween, and pre-feeding means for moving a document to be copied next from said tray means until the front edge of said next document reaches said waiting position, the improvement wherein said automatic

document feeder is so controlled as to automatically operate said pre-feeding means when said copying machine is operating in said one-side copying mode of operation or when said copying machine is scanning the first surface of a document in said two-side copying mode of operation and to automatically prevent said pre-feeding means from functioning when said copying machine is scanning the second surface of a document in said two-side copying mode of operation.

4,875,073

COLOR PICTURE IMAGE RECORDING APPARATUS CAPABLE OF ADJUSTING COLOR TONE IN THE COPY SHEET

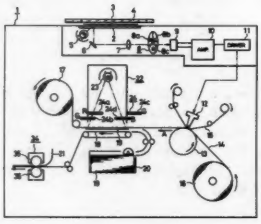
Masashi Ueda; Yoichi Horaguchi, both of Nagoya, and Kenji Sakakibara, Ichinomiya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Mar. 11, 1988, Ser. No. 167,140

Claims priority, application Japan, Mar. 12, 1987, 62-57188; Jan. 29, 1988, 63-20986

Int. Cl.[4] G03B *27/32, 27/52*

U.S. Cl. 355—27 **11 Claims**



1. A color image recording apparatus for recording an image of an original on a developer sheet with the use of a light-transmissive sheet and a photosensitive recording sheet, said apparatus comprising;

image forming means for forming a light shielding image corresponding to said image of said original on said light-transmissive sheet, said light-transmissive sheet on which said light shielding image is formed being used as a mask member, said mask member being moved in a first direction;

a lamp for emitting a white light;

filter means disposed to receive said white light and selectively passing a light of a predetermined wavelength, a filtering characteristic of said filter means being variable;

exposure means disposed downstream of said image forming means relative to the moving direction of said mask member for exposing said photosensitive recording sheet to said filtered light through said mask member to form a latent image corresponding to said light-shielding image on said photo-sensitive recording sheet, said photosensitive recording sheet carrying said latent image being moved in a second direction; and

developing means disposed downstream of said exposure means relative to the moving direction of said photo-sensitive recording sheet for developing said latent image into a visible image on said developer sheet, said developer sheet being held in superposed relation with said photosensitive recording sheet, whereby a color tone of said visible image is adjustable by varying said filtering characteristic of said filter means.

4,875,074

IMAGE RECORDING APPARATUS

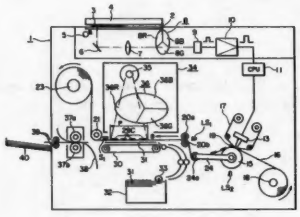
Kazuo Sangyoji; Jun Sakai; Shigeyuki Hayashi; Makoto Suzuki, and Yasuo Kimura, all of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Mar. 25, 1988, Ser. No. 173,610

Claims priority, application Japan, Apr. 1, 1987, 62-50566[U]; Apr. 6, 1987, 62-85176; Apr. 22, 1987, 62-61148[U]; Sep. 22, 1987, 62-238459

Int. Cl.[4] G03B *27/32, 27/52*

U.S. Cl. 355—27 **11 Claims**



1. An image recording apparatus for recording an image corresponding to an original on a developing medium with the use of a light-transmissive sheet and a photosensitive recording medium, said apparatus comprising:

image-forming means for sequentially forming each of a plurality of light-shielding images on said light-transmissive sheet movable in a predetermined direction;

exposing means disposed downstream of said image-forming means relative to the movement of said light-transmissive sheet for exposing said photosensitive recording medium to light through said light-transmissive sheet to form on said photosensitive recording medium a latent image corresponding to said light-shielding image;

accumulating means disposed between said image-forming means and said exposing means for accumulating said light-transmissive sheet carrying said light shielding image thereon;

developing means disposed downstream of said exposing means for developing said latent image on said photosensitive recording medium into a visible image on said developing medium, said developing medium being held in superposed relation with said photosensitive recording medium; and

control means for controlling said image-forming means and said accumulating means to form a subsequent light-shielding image on a light-transmissive sheet during exposure of a photosensitive recording medium through a previous light-shielding image on a light-transmissive sheet and holding the light-transmissive sheet carrying said subsequent light-shielding image in a standby condition at said accumulating means to prevent said sheet from being fed into said exposing means during the exposure through said previous light-shielding image.

4,875,075

IMAGE READING DEVICE AND IMAGE FORMING APPARATUS HAVING SAME

Sumitoshi Sootome, Yachiyo; Morikazu Mizutani, Tokyo; Isao Ikemoto, Kawasaki; Shinji Kanemitsu, Tokyo; Hajime Kitajima, and Shigeyoshi Onoda, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 12, 1987, Ser. No. 61,222

Claims priority, application Japan, Jul. 4, 1986, 61-157510

Int. Cl.[4] G03B *27/48, 27/50*

U.S. Cl. 355—50 **38 Claims**

1. An image forming apparatus for forming an image of an

original using as optical image of the original, said apparatus comprising:

a first assembly;

a second assembly cooperable with said first assembly, said second assembly being movable relative to said first assembly between a closed position wherein said apparatus is operable and an open position wherein said apparatus is opened;

a reciprocable original supporting member for supporting an original;

a first guide member on said first assembly, for guiding reciprocating movement of said original supporting member adjacent one of such sides of said original supporting member as are parallel to a direction of the reciprocating movement;

optical means, in said second assembly, for forming the

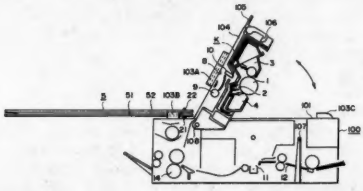


image of the original supported on said original supporting member;

a second guiding member, on said second assembly, for guiding and positioning said original supporting member adjacent another of said sides of said original supporting member, wherein said original supporting member is movable to be disengaged from said second guiding member when said second assembly is to be moved said open position, said second guiding member being contactable with said original supporting member to correctly position said original supporting member with respect to said second assembly when it is engaged with said original supporting member, whereby said second guiding member is effective to correctly position said original supporting member with respect to said optical means, while allowing disengagement of said original supporting member therefrom.

4,875,076

EXPOSURE APPARATUS

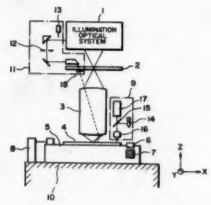
Makoto Torigoe, Kawasaki, and Akiyoshi Suzuki, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 14, 1988, Ser. No. 206,490

Claims priority, application Japan, Jun. 15, 1987, 62-147005; Sep. 29, 1987, 62-245244; Oct. 27, 1987, 62-271388; Dec. 28, 1987, 62-329722

Int. Cl.[4] G03B *27/42*

U.S. Cl. 355—53 **24 Claims**



1. An exposure apparatus, comprising:

a projection optical system operable to project, by use of a light of a wavelength, a pattern formed on a first object upon a second object;

a movable stage for holding thereon the second object;

illumination means for irradiating a mark formed on the first object with a light having substantially the same wavelength as the light used for the projection of the pattern upon the second object;

recording means including an erasably writable recording medium provided on said movable stage at a position different from the position at which the second object is held by said movable stage;

detecting means operable to detect, without intervention of said projection optical system, an image recorded on said recording medium; and

control means operable to control said illumination means so that an image of the mark on the first object is recorded on said recording medium with the intervention of said projection optical system.

4,875,077

IMAGE-FORMING MACHINE

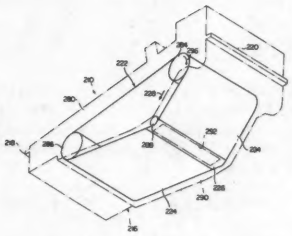
Junichi Takamatsu, Sennan, and Kazunori Akiyama, Suita, both of Japan, assignors to Mita Industrial Co., Ltd, Tokyo, Japan

Division of Ser. No. 50,438, May 18, 1987, Pat. No. 4,829,334. This application Dec. 15, 1988, Ser. No. 284,734

Claims priority, application Japan, May 28, 1986, 61-79541[U]; Oct. 13, 1986, 61-242597; Nov. 28, 1986, 61-281698

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—212 **6 Claims**



1. An image-forming machine comprising:

a main body member and a process unit adapted to be detachably mounted on the main body member;

said process unit including a process unit frame adapted to be mounted on the main body member and an image bearing member mounted on the process unit frame and adapted to be moved in a predetermined direction,

said image-bearing member having on the greater portion of the surface thereof an image-forming area on which to form an image, and having on the remainder of the surface thereof a non-image-forming area on which substantially no image is to be formed; and

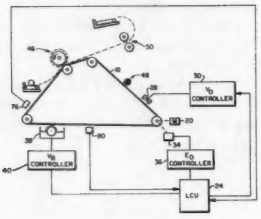
said process unit frame having a transfer opening for passage of a sheet material therethrough to bring the sheet material into intimate contact with the image-forming area of the image bearing member;

said image-bearing member and said process unit frame cooperating so that when an image-forming step is over, the non-image-forming area of the image bearing member is positioned at the transfer opening of the process unit frame.

4,875,078
DEAD TIME COMPENSATION FOR TONER REPLENISHMENT

William A. Resch, III, Pittsford, and Jonathan E. Moak, Macedon, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 8, 1988, Ser. No. 241,993
Int. Cl.[4] G03G *15/08*
U.S. Cl. 355—246 **15 Claims**



1. Toner replenishment control apparatus for development stations having means to add, mix, and charge toner particles, said apparatus comprising:

means for monitoring the toner concentration in the developer mix;

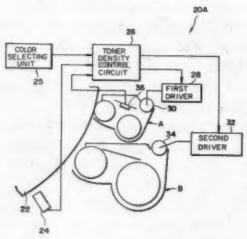
means for producing and storing initial toner concentration error and associated replenishment rate reference signals; and

means to produce an output replenishment rate based on the present toner concentration error signal and an initial toner concentration error signal and its associated replenishment rate reference signal stored for a period sufficiently long to assure that the toner has been well mixed and charged.

4,875,079
TONER DENSITY CONTROL FOR MULTICOLOR ELECTROPHOTOGRAPHIC COPIER

Takashi Bisaiji, Yokohama; Noboru Sawayama, and Hideo Yoo, both of Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 18, 1988, Ser. No. 170,264
Claims priority, application Japan, Mar. 19, 1987, 62-64596; Mar. 19, 1987, 62-64597
Int. Cl.[4] G03G *15/08, 15/01*
U.S. Cl. 355—246 **14 Claims**



1. A toner density control device for an image recorder which has a plurality of developing units arranged around a photoconductive element and selectively moves said developing units toward said photoconductive element according to a particular mode selected to develop an electrostatic latent image which is provided on said photoconductive element by toner of particular color which is stored in said developing unit, said device comprising:

toner supplying means each being associated with a respective one of said developing units for supplying toner to said developing unit associated;

sensing means responsive to the density of each of said toner stored in said individual developing units for producing a sense signal representative of said density;

mode specifying means for specifying said mode and generating a mode signal which is representative of said mode specified; and

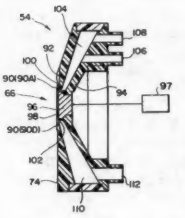
control means responsive to said sense signal from said sensing means and said mode signal from said mode specifying means for generating a control signal which controls each of said toner supplying means, thereby maintaining the density of toner stored in each of said developing units constant;

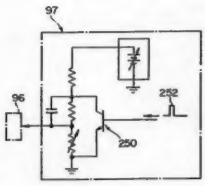
said control means controlling said sensing means such that said sensing means senses at a predetermined period the density of toner stored in one of said developing units which has been selected by said mode specified, wherein said period differs from one of said developing units to another.

4,875,080
METHOD OF AND APPARATUS FOR DEVELOPING ELECTROPHOTOGRAPHIC FILM USING LIQUID DEVELOPER

Akinori Kimura, and Akira Yoda, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 3,359, Jan. 14, 1987, abandoned. This application Jul. 5, 1988, Ser. No. 217,103
Claims priority, application Japan, Jan. 14, 1986, 61-5723
Int. Cl.[4] G03G *15/10*
U.S. Cl. 355—246 **20 Claims**





1. A method of developing an electrophotographic film wherein a liquid developer is supplied to a gap defined between a photosensitive layer side of said film that is electrically charged and an electrode disposed in opposing relation to said

photosensitive layer side, and a bias voltage of the same polarity as that of said charged film is applied to said electrode to develop said film, said method lasting for a predetermined period of time and comprising:

maintaining, for most of said predetermined time, said bias voltage substantially at a first voltage for causing an electric field to emanate from said photosensitive layer side of said film to cause developer to adhere to said photosensitive layer side, and

switching over said bias voltage at least once for a short period of time relative to said predetermined time to a second voltage for improving adhesion of said developer to a portion of said photosensitive layer side having a relatively low density.

11. A developing apparatus wherein a developer is supplied to an image formed on an electrophotographic film by light exposure to develop said image, said apparatus comprising:

(a) an electrode disposed in opposing relation to a photosensitive layer side of said film;

(b) supply means for supplying said developer to an area defined between said electrode and said film; and

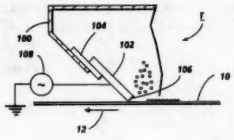
(c) a power supply including means for applying a bias voltage of same polarity as the electrically charged polarity of said film to said electrode, means for making said developer effectively adhere to a relative low density portion of said image on said electrophotographic film including means for switching over said bias voltage to a second voltage, and means for maintaining said second voltage for a relatively short period of time.

4,875,081

ELECTROPHOTOGRAPHIC DEVICE HAVING A.C. BIASED CLEANING MEMBER

William L. Goffe, Webster, and Joseph G. Schram, Liverpool, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 24, 1988, Ser. No. 261,869
Int. Cl.[4] G03G *15/08, 15/00*
U.S. Cl. 355—303 **29 Claims**



1. In an electrostographic device having a charge retentive surface for development of latent images formed thereon with toner, a transfer station for transferring developed latent images to another surface, and means of cleaning residual toner remaining after transfer of the developed latent images from said charge retentive surface, said cleaning means comprising:

a conductive cleaning member;

said cleaning member supported adjacent to the charge retentive surface;

an A.C. power supply, electrically connected to said cleaning member, and driving said cleaning member to produce an electric field at said charge retentive surface, whereby residual toner, remaining after transfer of the developed latent images from said charge retentive surface, is released from said charge retentive surface into a cloud as it approaches said cleaning member, and

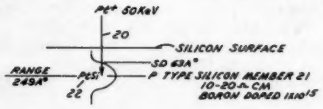
means for removing said clouded toner from the area adjacent to said cleaning member.

4,875,082

SCHOTTKY BARRIER PHOTODIODE STRUCTURE

Richard A. Bredthauer, Dana Point, Calif., assignor to Ford Aerospace Corporation, Newport Beach, Calif.

Continuation of Ser. No. 39,181, Apr. 16, 1987, abandoned, which is a division of Ser. No. 876,563, Jun. 20, 1986, Pat. No. 4,742,017. This application Dec. 14, 1988, Ser. No. 285,354
Int. Cl.[4] H01L *29/48, 27/14*
U.S. Cl. 357—15 **4 Claims**



1. A Schottky barrier photodiode for detecting infrared radiation having a structure wherein:

a p-type silicon substrate has a N+ type silicon guard ring, a metal silicide is within the boundary of the N+ guard ring, a relatively thin oxide passivation layer is formed on the metal silicide, and a thicker silicon dioxide passivation layer is formed on the remainder of the p-type silicon;

said metal silicide is formed of at least two metals including platinum and palladium having a distribution with a maximum concentration below the silicon surface, with decreasing concentration on both sides of the maximum concentration; and

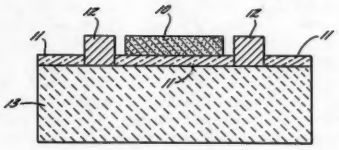
a reflecting metal layer is formed on said relatively thin oxide passivation layer to reflect infrared radiation back to said metal silicide.

4,875,083

METAL-INSULATOR-SEMICONDUCTOR CAPACITOR FORMED ON SILICON CARBIDE

John W. Palmour, Raleigh, N.C., assignor to North Carolina State University, Raleigh, N.C.

Filed Oct. 26, 1987, Ser. No. 113,572
Int. Cl.[4] H01L *29/24, 29/93, 29/94*
U.S. Cl. 357—23.6 **14 Claims**



1. A variable capacitance metal-insulator-semiconductor capacitor with reduced series resistance and lesser leakage current, suitable for operation at high temperatures and high radiation densities, and comprising:

a substantially variable capacitance doped semiconductor portion formed of silicon carbide having substantially uniform high resistivity for substantially varying the capacitance thereof when said doped semiconductor portion is depleted of carriers;

a substantially constant capacitance portion of insulator material upon one surface of said silicon carbide semiconductor portion;

a metal portion upon said substantially constant capacitance insulator portion for defining an active region of said silicon carbide semiconductor portion, and for variably depleting said active region of carriers when a bias is applied to said metal portion; and

an ohmic contact upon said one surface of said silicon carbide semiconductor portion so that a bias applied to said

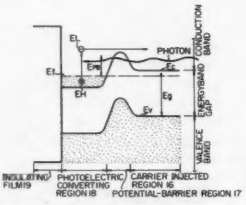
metal portion variably depletes said silicon carbide semiconductor portion of carriers, substantially varies the capacitance of said silicon carbide semiconductor portion, and correspondingly substantially varies the total capacitance of said capacitor.

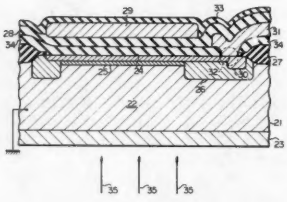
4,875,084

OPTOELECTRIC TRANSDUCER

Shigeru Tohyama, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Mar. 28, 1988, Ser. No. 174,464
Claims priority, application Japan, Mar. 26, 1987, 52-73240
Int. Cl.[4] H01L *27/14, 31/06*
U.S. Cl. 357—30 **18 Claims**





1. An optoelectric transducer operative to produce electric charges in the presence of incident light, comprising:

(a) a carrier injected region with a first conductivity type formed of a nondegeneratively doped semiconductor material;

(b) a potential-barrier region contiguous to said carrier injected region for producing a first homojunction and formed of a material selected from the group consisting of as first semiconductor material of said first conductivity type lower in impurity atom concentration than said carrier injected region, an intrinsic semiconductor material and a second semiconductor material of a second conductivity type opposite to said first conductivity type;

(c) a photoelectric converting region with said first conductivity type formed of a degeneratively doped semiconductor material and operative to produce hot majority carriers and hot minority carriers upon an illumination of said incident light, said hot majority carriers being injected into said carrier injected region, a second homojunction being formed between said potential-barrier region and said photoelectric converting region, said second semiconductor material having a thickness and an impurity atom concentration selected in such a manner as to be perfectly depleted due to depletion layers extending from said first and second homojunctions in at least an electric charge producing operation; and

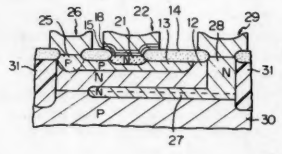
(d) short-circuit means electrically interconnecting said photoelectric converting region and said potential-barrier region, in which a cut-off wavelength of said incident light is decided by a barrier height at said second homojunction, wherein said short-circuit means provides a potential barrier lower than that between said potential-barrier region and said photoelectric converting region with respect to minority carriers produced in the photoelectric converting region.

4,875,085

SEMICONDUCTOR DEVICE WITH SHALLOW N-TYPE REGION WITH ARSENIC OR ANTIMONY AND PHOSPHORUS

Katsunobu Ueno, and Osamu Hataishi, both of Yokohama, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 915,522, Oct. 6, 1986, abandoned, which is a division of Ser. No. 640,577, Aug. 14, 1984, Pat. No. 4,629,520. This application May 17, 1988, Ser. No. 195,468
Claims priority, application Japan, Aug. 30, 1983, 58-159949
Int. Cl.[4] H01L *29/72*
U.S. Cl. 357—34 **3 Claims**



1. A semiconductor device, comprising:

a single crystalline substrate;

a p-type semiconductor epitaxial layer of single crystalline silicon formed on said single crystalline layer;

an n-type region, formed in said p-type semiconductor epitaxial layer, comprising an upper subregion with phosphorous and at least one of arsenic and antiomony diffused therein and a lower subregion, below the upper subregion, with the at least one of arsenic and antimony and substantially no phosphorous diffused therein;

an insulation film, formed on said p-type semiconductor epitaxial layer, having a window at said n-type region;

a first polycrystalline silicon film, formed on said n-type region and at the window in said insulation film, including silicon, phosphorous and the at least one of arsenic and antimony;

a second polycrystalline silicon film, formed on said first polycrystalline film, including silicon and phosphorous, said first and second films having identical predetermined patterns; and

a metal layer formed on said second polycrystalline silicon film, whereby said first and second polycrystalline silicon films and said metal layer form a contact structure for said n-type region.

4,875,086

SILICON-ON-INSULATOR INTEGRATED CIRCUITS AND METHOD

Satwinder D. S. Malhi, Garland; Chi-Cheong Shen; Kenneth E. Bean, both of Richardson, and Peng-Heng Chang, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed May 22, 1987, Ser. No. 53,440
Int. Cl.[4] H01L *23/08, 23/14, 23/10, 25/08*
U.S. Cl. 357—54 **13 Claims**

1. An integrated circuit, comprising:

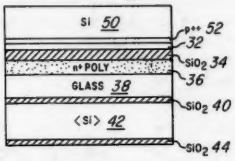
(a) a silicon layer with active devices;

(b) said silicon layer on an insulating layer;

(c) said insulating layer on a buffer layer; and

(d) a glass layer bonding said buffer layer to a substrate, said

glass layer of composition characterized by heating of a mixture of glass paticles in a liquid between said buffer



layer and said substrate to partially drive off and partially decompose said liquid plus fire said glass particles.

4,875,087

INTEGRATED CIRCUIT DEVICE HAVING STRIP LINE STRUCTURE THEREIN

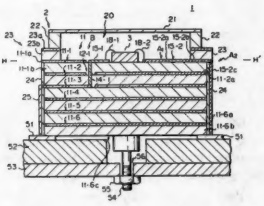
Akira Miyauchi, Kawasaki; Hiroshi Nishimoto, Tokyo; Tadashi Okiyama; Hiroo Kitasagami, both of Kawasaki; Masahiro Sugimoto; Haruo Tamada, both of Yokohama, and Shinji Emori, Urawa, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 851,205, Apr. 14, 1986. This application Jul. 22, 1988, Ser. No. 222,303

Claims priority, application Japan, Apr. 13, 1985, 60-077550

Int. Cl.[4] H01L *23/12, 23/14*

U.S. Cl. 357—71 **7 Claims**



1. An integrated circuit device, comprising:
a first insulation layer having top and bottom surfaces;
a strip line layer formed on the top surface of said first insulation layer and having a first portion of a first width, a second portion of a second width smaller than said first width, and a third portion of a width greater than said second width;
a second insulation layer formed on said second portion of said strip line layer;
a semiconductor chip mounted on the top surface of said first insulation layer and electrically coupled to said strip line layer;
a first conductive layer formed on the bottom surface of said first insulation layer;
a second conductive layer formed on said second insulation layer;
a wall portion formed on said second conductive layer; and
a cap formed on said, wall portion, said cap, said wall portion, said second conductive layer and said second insulation layer forming a hermetically sealed cavity, said first portion of said strip line layer being hermetically sealed within said cavity and, with said first insulation layer and said first conductive layer, forming a microstrip line structure having a first characteristic impedance, and said first insulation layer, said second portion of said strip line layer and said second insulating layer forming a triplate strip line structure having a second characteristic impedance equal to said first characteristic impedance.

4,875,088

SEMICONDUCTOR DEVICE HAVING A BACKPLATE ELECTRODE

Hidemitsu Egawa, Tokyo; Riichirou Aoki, Ichikawa, and Katsuya Okumura, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 20, 1987, Ser. No. 28,386

Claims priority, application Japan, Mar. 29, 1986, 61-72116

Int. Cl.[4] H01L *23/48*

U.S. Cl. 357—67 **28 Claims**

1. A semiconductor device comprising:
a semiconductor pellet having a top surface on which an integrated circuit is formed and a back surface formed by a semiconductor material; and
backplate electrode means, including a metal nitride film having conductivity and an anti-oxidation property, said backplate electrode means being formed on the entire back surface of said pellet, for obtaining at said back surface of said pellet a substantially uniform backplate potential.

4,875,089

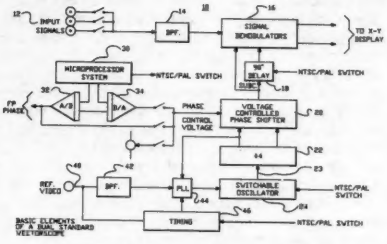
MULTI-STANDARD VECTORSCOPE

John L. Judge, Hillsboro, Oreg., assignor to Magni Systems, Inc., Beaverton, Oreg.

Continuation of Ser. No. 204,647, Jun. 9, 1988, abandoned. This application Mar. 22, 1989, Ser. No. 328,741

Int. Cl.[4] H04N *17/02, 11/20*

U.S. Cl. 358—10 **6 Claims**

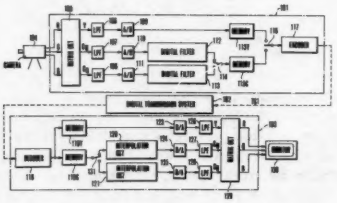


1. A multi-standard vectorscope comprising
demodulator means for receiving input video signals,
switchable oscillator means connected to said demodulator means for generating at least first and second oscillator signals, said oscillator means connected to receive first and second standard color information signals which correspond to said first and second oscillator signals, respectively,
control means for switching between said first and second oscillator signals depending upon whether said oscillator means receives said first or second standard signals,
said demodulator means responsive to said first or second oscillator signals to demodulate said input video signals.

4,875,090
INFORMATION DATA TRANSMISSION SYSTEM

Makoto Shimokoriyama; Shinichi Yamashita; Naoto Abe, all of Kanagawa; Motokazu Kashida, Tokyo; Masahiro Takei, and Koji Takahashi, both of Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 16, 1987, Ser. No. 3,941
Claims priority, application Japan, Jan. 27, 1986, 61-016387
Int. Cl.[4] H04N *11/06*
U.S. Cl. 358—12 14 Claims



1. An image information signal transmission system for transmitting an image information signal including at least a luminance information signal and a chrominance information signal, comprising:

(A) conversion means for receiving said luminance information signal and said chrominance information signal and for converting these signals to respective digital signals, thereby producing respective digital luminance information data and digital chrominance information data corresponding to said luminance information signal and said chrominance information signal;

(B) predictive encoding means for receiving said digital luminance information data and said digital chrominance information data and for predictively encoding both said data to produce respective predictively encoded digital luminance information data corresponding to said digital luminance information data and predictively encoded digital chrominance information data corresponding to said digital chrominance information data; and

(C) data output means for receiving said digital luminance information data and said digital chrominance information data produced by said conversion means and said predictively encoded digital luminance information data and said predictively encoded digital chrominance information data and, with regard to at least said digital luminance information data and said digital chrominance information data, for producing outputs of the digital luminance information data and the digital chrominance information data in such a manner that the amount of the digital luminance information data output corresponding to a predetermined amount of said luminance information signal received by said conversion means is equal to the amount of the digital chrominance information data output corresponding to a predetermined amount of the chrominance information signal received by said conversion means.

4,875,091
FIELD SEQUENTIAL COLOR IMAGING APPARATUS

Hidetoshi Yamada, Tokyo, and Tatsuo Nagasaki, Yokohama, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

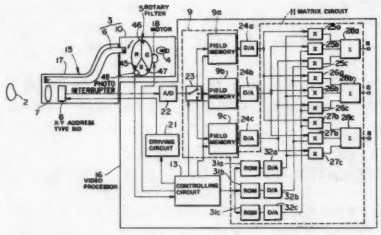
Filed Mar. 16, 1988, Ser. No. 168,796
Claims priority, application Japan, Mar. 17, 1987, 62-61684
Int. Cl.[4] H04N *9/04, 7/18, 9/67*
U.S. Cl. 358—42 12 Claims

1. A field sequential color imaging apparatus comprising:

a field sequential illumination means for illuminating an object by light having different wavelengths for each of several fields;

an imaging means comprised of an image forming lens for forming an image of said object, and an X-Y addressed solid state imaging device disposed in the focal plane of said image forming lens;

a solid state imaging device drive means for applying a drive signal to said X-Y addressed solid state imaging device for each of said fields so as to allow a signal which has been photoelectrically converted by said solid state imaging device to be read out;



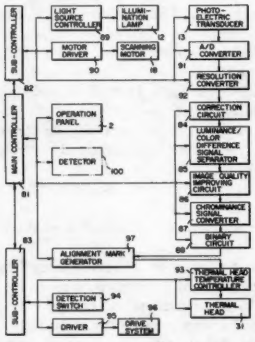
a memory means comprised of field memories for temporarily storing signals of corresponding fields which have been read out from said solid state imaging device; and

a matrix means for performing on a plurality of signals read out from said memory means a weighting which accounts for the timing at which said signals were read out from said solid state imaging device and for adding the weighted results so as to produce predetermined color video signals.

4,875,092
IMAGE FORMING APPARATUS WITH POSITIONING-MARK FORMING FUNCTION

Eiichi Yamanishi, Kawasaki; Yasuo Abuyama, Ebina, and Akihiko Someya, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 12, 1987, Ser. No. 84,560
Claims priority, application Japan, Aug. 15, 1986, 61-190599; Aug. 15, 1986, 61-191264
Int. Cl.[4] H04N *1/46*
U.S. Cl. 358—75 9 Claims



1. An image forming apparatus comprising:

scanning means for optically scanning an original to obtain color signals of different colors;

color converting means for converting the color signals from said scanning means into image formation signals of different colors;

determining means for determining whether the image forming medium is a normal paper sheet or a graphic arts film;

image forming means for forming a single- or multi-color image on an image forming medium by using a single- or multi-color image transfer medium in accordance with one or a plurality of image formation signals outputted from said color converting means;

means for forming the image by controlling said image forming means in accordance with a determination result of said determining means;

generating means for generating a positioning-mark pattern; and

means for adding the positioning-mark pattern from said generating means to the single- or multi-color image when the image is formed by said image forming means.

4,875,093

ULTRAFAST CONTINUOUS IMAGING APPARATUS

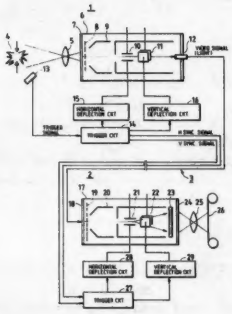
Musubu Koishi; Yoshihiko Mizushima, and Hirofumi Kan, all of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

Filed Sep. 30, 1988, Ser. No. 251,595

Claims priority, application Japan, Sep. 30, 1987, 62-246894

Int. Cl.[4] H04N *5/04, 5/08*

U.S. Cl. 358—83 **6 Claims**



1. An ultrafast continuous imaging apparatus comprising:

image pickup means for converting light from an object to first electron beams, deflecting said first electron beams to produce electron signals corresponding to pixel groups each comprising at least one pixel and successively and continuously converting said electron signals to time-series light signals, and

image receiving means for converting said time-series light signals to second electron beams, deflecting said second electron beams in synchronism with said image pickup means and converting said deflected second elelectron beams to a reproduced image.

4,875,094

METHOD OF AND DEVICE FOR ESTIMATING MOTION IN A SEQUENCE OF PICTURES

Mohammad-Rèza Haghiri, Fontenay-Aux-Roses, and Bertrand Boutrois, Paris, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 8, 1988, Ser. No. 179,109

Claims priority, application France, Apr. 10, 1987, 87 05121

The portion of the term of this patent subsequent to Aug. 23, 2005, has been disclaimed.

Int. Cl.[4] H04N *7/18, 7/12*

U.S. Cl. 358—105 **4 Claims**

1. A method of estimating motion in a picture sequence in which each picture is divided into blocks of I×J elements, where I and J are integers greater than one, and in which the luminosity of each element is expressed in a digital form and each of these blocks is defined by two coordinates (m,n), respectively, indicating the row of the picture line in which the block is present and the row of the block on this m-th line, characterized in that it comprises:

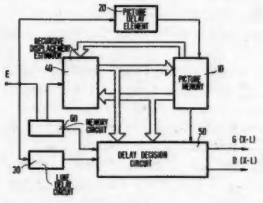
(A) preserving the preceding picture with respect to the current picture for constituting a reference picture;

(B) defining three groups for the blocks classified as fixed blocks, moving blocks and blocks referred to as exposed blocks, in which groups the blocks are classified with a delay of L blocks in accordance with the scanning of the picture by examining a given number of possible group sequences for the L blocks succeeding the current block X considered and in accordance with a given classification criterion, said criterion for the fixed and moving blocks being the difference in luminosity between two successive pictures, taking the displacement of the blocks of one picture with respect to the other into account for the moving blocks, and the difference in luminosity between two adjacent lines for the exposed blocks;

(C) constructing a classification tree whose 3^L branches at each successive level are equal in number to those of the possible groups and which correspond from the first to the Lth level to the sequences of possible groups for the L considered successive blocks of the picture sequence;

(D) associating two parameters with each branch of each level:

(a) a first parameter referred to as displacement vector reprsentative of the possible displacement of the block



with respect to the picture or to the preceding line and determined, by means of a recursive displacement estimation method, for the central element which is representative of the said block;

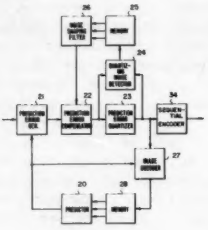
(b) a second parameter referred to as cumulated distortion representative of the cumulative sum of the classifcation errors of the preceding blocks, the groups of these blocks being those of the tree branches traversed to arrive at the current branch, each classification error being rendered minimum by taking into account the influence of a displacement estimated for a block on the displacement estimated for the L following blocks, said influence being only examined, among the 3^L possible branches of the tree, for M branches of the weakest cumulated distortion referred to as surviving branches, where M is a limited number chosen to be substantially smaller than the maximum number of branches 3^L;

(E) in accordance with this procedure relating to L blocks, taking a decision of the majority type concerning the effective group and concerning the displacement vector of the block situated L blocks earlier with respect to the current block, said decision being taken by examining the surviving branches and by classifying each block situated L blocks earlier in the group to which the largest number of these surviving branches corresponds, the corresponding displacement vector being thus considered as the displacement of this block situated L blocks earlier, said decision procedure being identically repeated but for the L last blocks of the picture sequence in which one avoids taking a decision.

4,875,095
NOISE-SHAPING PREDICTIVE CODING SYSTEM

Shuichi Matsumoto, Fujimi, and Hitomi Murakami, Yokohama, both of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 15, 1988, Ser. No. 207,121
Claims priority, application Japan, Jun. 30, 1987, 62-161351; Jun. 30, 1987, 62-161352
Int. Cl.[4] H04N 7/137
U.S. Cl. 358—133 5 Claims



1. A noise-shaping, predictive coding method using information of already coded picture elements to obtain a predicted value of a next picture element to be coded, comprising:

obtaining a prediction error value between an input picture element and said predicted value;

obtaining a noise shaping filter value for compensating for said prediction error value from information of quantizing noise superimposed on said already coded picture elements;

quantizing a difference value between the prediction error value and said noise shaping filter value into a predetermined quantization representative value;

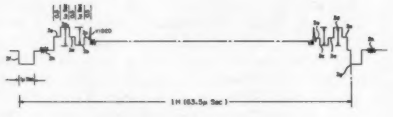
consolidating quantization representative values of several picture elements into one block; and

coding the one block using a short or long code which is assigned in dependence on whether the probability of occurrence of the assigned code is high or low.

4,875,096
ENCODING OF AUDIO AND DIGITAL SIGNALS IN A VIDEO SIGNAL

Ralph H. Baer, Manchester, N.H.; Kenneth J. Curran, Redondo Beach, and Jay Smith, III, Los Angeles, both of Calif., assignors to Smith Engineering, Culver City, Calif.

Filed Aug. 20, 1989, Ser. No. 898,268
Int. Cl.[4] H04N 7/04
U.S. Cl. 358—143 4 Claims



1. A method of encoding multiple audio and digital signals into a video signal having a plurality of displayable video areas, each area comprising substantially the entire period between a pair of horizontal sync pulses, comprising the steps of:

sampling the audio signals to produce a set of samples;

amplitude modulating said samples onto sampling pulses;

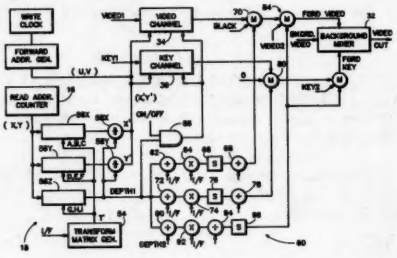
placing the amplitude modulated sampling pulses into a portion of each of a plurality of said displayable video areas; and

encoding digital commands in the form of bits in the video signal, one bit occupying substantially the entire portion of a selected one of said displayable video areas not allotted to the amplitude modulated sampling pulses.

4,875,097
PERSPECTIVE PROCESSING OF A VIDEO SIGNAL

Richard A. Jackson, Nevada City, Calif., assignor to The Grass Valley Group, Inc., Grass Valley, Calif.

Continuation of Ser. No. 922,633, Oct. 24, 1986, abandoned.
This application May 26, 1988, Ser. No. 203,575
Int. Cl.[4] H04N 3/223, 5/262
U.S. Cl. 358—180 19 Claims



12. Apparatus for processing a video signal comprising:

means for generating a depth signal having a depth value for each pixel of a scene represented by the video signal;

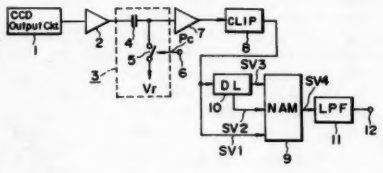
means for generating a perspective dim key signal from the depth signal; and

means for combining the video signal with a black signal under control of the perspective dim key signal to produce a dimmed video signal.

4,875,098
OUTPUT SIGNAL PROCESSING CIRCUIT FOR CCD REGISTER

Isamu Yamamoto, and Takashi Asaida, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 12, 1988, Ser. No. 256,407
Claims priority, application Japan, Oct. 20, 1987, 62-264808
Int. Cl.[4] H04N 5/18
U.S. Cl. 358—213.16 7 Claims



5. A solid-state video camera comprising:

a solid-state image pickup device of charge coupled type (CCD type) including photo-sensitive elements arranged into a matrix;

a plurality of vertical shift registers for shifting charges generated in said photo-sensitive elements in a vertical direction;

a plurality of horizontal shift registers each shifting a charge from a selected one of said vertical shift registers in a horizontal direction and generating a pulsed video information signal having a precharge duration, a reference duration and a signal duration repeatedly;

a plurality of output signal processing circuits connected to said horizontal shift registers respectively and each including a clamp circuit for clamping said pulsed video information signal in such a manner that the voltage of said reference duration becomes a stable clamp voltage;

a plurality of selective delay means respectively supplied with the outputs of the clamp circuits for selectively delaying the same so that the delays imparted to the individual outputs of said clamp circuits become different from one another; and

non-additive mixing circuit means supplied with the outputs of said selective delay means for generating a combined video information signal.

4,875,099

DEVICE FOR MERGING PLURAL SENSOR OUTPUTS ONTO A SINGLE CONDUCTOR

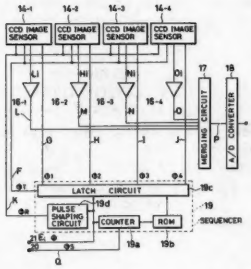
Shunji Sakai; Tohru Kitagawa; Kunikazu Suzuki, and Naohiro Watanabe, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed May 23, 1988, Ser. No. 197,403

Claims priority, application Japan, May 22, 1987, 62-123692; May 22, 1987, 62-123693; May 22, 1987, 62-123694

Int. Cl.[4] H04N *3/14*

U.S. Cl. 358—213.11 **17 Claims**



1. A contact-type image scanner having a plurality of CCD image sensors arranged in a row, comprising:

a timing control means for individually controlling at least one clock control signal for each of said CCD image sensors; and

a merging circuit for merging output signals from said CCD image sensors into one merged signal output.

4,875,100

ELECTRONIC SHUTTER FOR A CCD IMAGE SENSOR

Kazuya Yonemoto; Yoshiaki Kagawa; Kikue Ishikawa; Tomoyuki Suzuki, and Masaharu Hamasaki, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

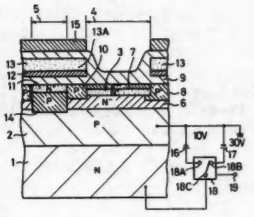
Filed Oct. 21, 1987, Ser. No. 110,844

Claims priority, application Japan, Oct. 23, 1986, 61-252375; Dec. 23, 1986, 61-307474

Int. Cl.[4] H04N *5/335*

U.S. Cl. 358—213.19 **2 Claims**

2. A method for utilizing a CCD image device as an electronic shutter for an electronic camera comprising the step of applying a voltage potential across a semiconductor substrate of a first conductivity type and a region of a second conductivity type formed upon said semiconductor substrate within a horizontal blanking period to thereby discharge signal charges accumulated in a signal charge accumulating region formed on a surface side of said region of a second conductivity type to



said semiconductor substrate within said horizontal blanking period.

4,875,101

SOLID STATE PHOTOVOLTAIC IMAGING DEVICE WITH EXCESS CHARGE ELIMINATOR

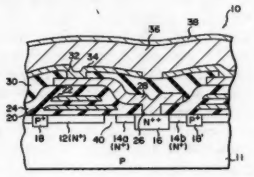
Yukio Endo, and Nozomu Harada, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 4, 1987, Ser. No. 94,002

Claims priority, application Japan, Sep. 11, 1986, 61-212557

Int. Cl.[4] H04N *5/335*

U.S. Cl. 358—213.19 **8 Claims**



1. An image sensing device comprising:

(a) a CCD image sensor, comprising

semiconductive cells which are aligned on a substrate to define picture elements of said image sensor and to form at least one linear cell array,

a photosensitive layer which is arranged above said substrate, is conducted to said semiconductive cells, and photovoltaicly generates charges upon incidence of image light thereonto, the charges being supplied to said semiconductive cells and stored therein,

a vertical charge transfer section which is formed on said substrate and has a plurality of transfer electrodes aligned along said linear cell array, said vertical charge transfer section having first and second end portions,

a horizontal charge transfer section provided on said substrate to be coupled to the first end portion of said vertical charge transfer section, and

a semiconductive drain layer provided on said substrate to be coupled to the second end portion of said vertical charge transfer section; and

(b) driver means, electrically connected to said image sensor, for (i) in a signal charge readout mode of said image sensor, driving said vertical charge transfer section to move charges flowing from said linear cell array in a first transfer direction and to partially transfer the charges to said horizontal charge transfer section, and for (ii) in an excess charge sweep-out mode performed in a vertical blanking period of said image sensor, driving said vertical charge transfer section to move residual charges left therein in a second transfer direction opposite to the first transfer direction and to transfer the charges to said drain layer,

whereby the residual charges are discharged to said drain layer as excess charges.

4,875,102

AUTOMATIC CORRECTING OF PICTURE UNSTEADINESS IN TELEVISION FILM SCANNING

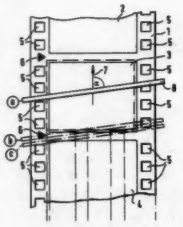
Dieter Poetsch, Ober-Ramstadt, Fed. Rep. of Germany, assignor to BTS Broadcast Television Systems GmbH, Darmstadt, Fed. Rep. of Germany

Filed Oct. 24, 1988, Ser. No. 261,973

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1987, 3736789

Int. Cl.[4] H04N *5/253*

U.S. Cl. 358—214 **49 Claims**



1. Method of detecting and electronically correcting picture unsteadiness in television scanning of continuously advancing motion picture films comprising the steps of:

scanning, at an oblique angle (α) to the direction of advance of the film, by means of a light source and a light sensor, reference features of the film which are selected from the group consisting of sprocket holes of the film, marks produced photographically on the film outside picture boundaries, picture edge boundaries and picture content features determined by picture to picture comparison to be stationary in the picture, in order to produce a scanned position signal pattern, first doing so to produce a reference position signal pattern and then storing said reference signal pattern in a reference pattern memory and thereafter repeating the scanning for transmission of television pictures and producing a currently observed position signal pattern relating to the scanned referenced features;

comparing said reference signal pattern and said currently observed position signal to produce a difference signal;

deriving from said difference signal at least one horizontal correction signal for horizontal picture position correction and at least vertical correction signal for vertical picture position correction and

performing, by means of said horizontal and vertical correction signals, electronic compensation of horizontal and vertical unsteadiness in television pictures of scanned motion picture film frames.

4,875,103

APPARATUS AND METHOD FOR ALIGNING A REPOSITIONABLE IMAGING SENSOR WITH A PHOTOGRAPHIC IMAGE IN A FILM VIDEO SYSTEM

Mark E. Bridges, Spencerport; Robert W. Easterly, Churchville, and John R. Fredlund, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 19, 1988, Ser. No. 233,783

Int. Cl.[4] H04N *3/36*

U.S. Cl. 358—214 **11 Claims**

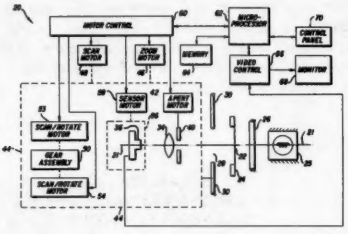
1. Apparatus which transfers to video an image previously recorded on a photographic medium such as film or a print, said apparatus comprising:

a. sensor means for generating a first output signal in response to light energy;

b. light means for directing light energy toward the sensor means;

c. means for masking at least part of the light energy from reaching the sensor means;

d. means, responsive to the first output signal, for detecting a remaining part of the light energy which reaches the sensor means; and



e. means for repositioning the sensor means relative to the masking means until a change in the amount of light reaching the detecting means is determined in order to identify an edge of the masking means, the repositioning means including: (i) means for moving the sensor means relative to the masking means and (ii) means for generating an edge signal when an edge of the mask is identified, the moving means being responsive to the edge signal in order to orient the sensor means relative to the masking means.

4,875,104

DOCUMENT SHEET POSITION DETECTING DEVICE FOR IMAGE FORMING APPARATUS

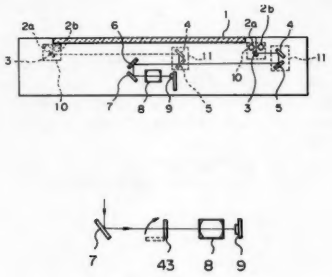
Kouichi Kamon, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed May 11, 1988, Ser. No. 192,522

Claims priority, application Japan, May 13, 1987, 62-114465

Int. Cl.[4] H04N *1/00, 1/40*

U.S. Cl. 358—400 **35 Claims**



1. A document sheet position detecting device for optically detecting the extension of an image bearing document sheet by a raster scanning operation, comprising:

a document sheet cover for pressing said document sheet onto a contact glass platen, said cover being colored by a certain predetermined color;

illumination means for illuminating the surface of said image bearing document sheet;

an optical system for passing light rays reflected by said surface of said image bearing document sheet;

a photoelectric converter element for receiving light rays and for converting said light rays into electric signals;

digital converter means for converting the outputs from said photoelectric converter element into digital signals;

an optical filter for shielding light rays reflected by said document cover and for transmitting therethrough light rays reflected by the background of said image bearing document sheet during a document sheet position detecting operation, said optical filter being interposed in the optical path of the reflected light during the document sheet position detecting operation and retracted from the optical path of the reflected light during the normal image read-out operation; and

data processing means for detecting at least one end of said image bearing document sheet by processing positional data fed from said photoelectric converter means, the positional data indicating said document sheet cover being differentiated from the positional data indicating the background of said image bearing document sheet by the difference in quantity of light rays reflected by said background of said image bearing document sheet and passing through said optical filter to be received by said photoelectric converter means.

4,875,105

VIDEO SIGNAL PROCESSING DEVICE

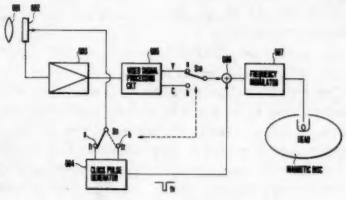
Kazuhito Ohashi, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 894,127, Aug. 7, 1986, abandoned. This application Jan. 7, 1988, Ser. No. 144,591

Claims priority, application Japan, Aug. 7, 1985, 60-172440; Aug. 7, 1985, 60-172441

Int. Cl.[4] H04N *9/07, 9/81, 11/10*

U.S. Cl. 358—310 **12 Claims**



1. A video signal processing device, comprising:

image sensing means for permitting non-destructive read-out;

clock pulse generating means for generating clock pulses in one horizontal scanning period, said clock pulse generating means being arranged so as to generate first clock pulses having a first frequency during a first period shorter than said horizontal scanning period, and so as to generate second clock pulses having a second frequency higher than said first frequency during a second period other than said first period in said one horizontal scanning period; and

signal processing means for forming a first video signal by using a signal put out from said image sensing means by driving said image sensing means with said first clock pulses generated by said clock pulse generating means, and a second video signal by using a signal put out from said image sensing means by driving said image sensing means with said second clock pulses generated by said clock pulse generating means, sand to put said first and second video signals in the horizontal scanning period in a time-division multiplexing manner.

4,875,106

METHOD AND APPARATUS FOR CONCEALING ERRORS IN REPRODUCED DIGITAL SIGNALS UTILIZING FIR FILTER

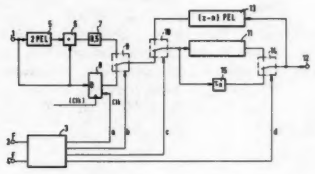
Jürgen Heitman, Alsbach/Hähnlein, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed May 24, 1988, Ser. No. 198,133

Claims priority, application Fed. Rep. of Germany, Jun. 11, 1987, 3719405

Int. Cl.[4] H04N *5/94*

U.S. Cl. 358—314 **8 Claims**



1. Method of concealing errors in the reproduction of recorded digital video signals comprising successions of digital words corresponding to pixels, comprising the steps of:

detecting erroneous pixel words and replacing them with artificial pixel words marking the presence of an erroneous pixel while also supplying an error designating signal in timed relation to each said artificial pixel word;

passing successive pixel words through a finite-impulse-response (FIR) digital filter for correction of erroneous pixel words under control of a signal derived from said error designating signals when said erroneous pixel words respectively are in a central position in said FIR filter, and transmitted to said FIR filter in the event that more than one erroneous pixel word is to be present at the same time in said filter, said auxiliary pixel words being derived from values of pixels neighboring the pixel represented by the erroneous pixel word to be replaced thereby.

4,875,107

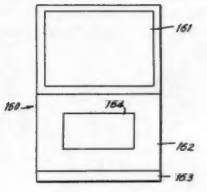
CAMCORDER

Thomas Heidt, Long Valley, N.J., and James C. Wickstead, Pitney Rd. and W. Main, Mendham, N.J. 07945, assignors to James C. Wickstead, Mendham, N.J.

Filed Dec. 4, 1986, Ser. No. 938,087

Int. Cl.[4] H04N *5/78*

U.S. Cl. 360—9.1 **72 Claims**



1. A video apparatus for storing video images on a recording medium, comprising:

camera means for converting light images into electrical video signals; the camera means including lens means for focusing light and first integrater means for integrating the light focused by the lens means; the lens means being an aspheric lens;

processing means coupled to the camera means including means for converting the electronic video signals into a low bandwidth frequency modulated storage signal with a

bandwidth substantially lower than a standard television video signal; and

recording means coupled to the processing means for storing the low bandwidth frequency modulated storage signal on an audio cassette having a standard speed allowing storage of an audio bandwidth signal, the recording means including drive means for driving the audio cassette at higher than normal speed to increase the bandwidth storage capacity of the audio cassette and recording head means for storing the low bandwidth frequency modulated storage signal on the audio cassette.

4,875,108

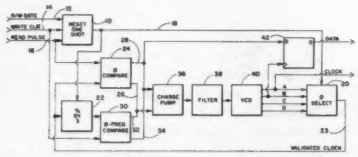
PHASE LOCK LOOP

Vadim B. Minuhin, Bloomington; Evgeny J. Berzon, St. Louis Pk., and Vernon F. VonDeylen, Bloomington, all of Minn., assignors to Magnetic Peripherals Inc., Minneapolis, Minn.

Filed Aug. 2, 1988, Ser. No. 227,216

Int. Cl.[4] G11B *5/09*; H03L *7/00*

U.S. Cl. 360—51 **7 Claims**



1. A phase lock loop comprising compare means responsive to an input signal and to a clock signal for determining the phase difference between said input signal and said clock signal; charge pump means responsive to the phase difference determined by said compare means for providing a pump signal; oscillator means responsive to said pump signal for providing a periodic signal having a frequency determined by said pump signal; phase shift means responsive to said oscillator means for providing a plurality of signals each at said frequency of said periodic signal and each phase shifted from the others of said plurality of signals by a predetermined amount; and phase select means for selecting the one of said plurality of signals whose phase is closest to the phase of said input signal, and providing said selected one signal as said clock signal.

4,875,109

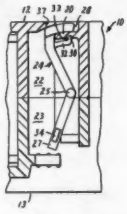
RECORD/NOT RECORD LATCH FOR RECORDING CASSETTE

Robert L. Hanson, East Bethel, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 9, 1988, Ser. No. 191,342

Int. Cl.[4] G11B *15/04, 23/02*

U.S. Cl. 360—60 **8 Claims**



1. A recording cassette formed to provide a record/nor record opening extending through both an under wall of the cassette and a top wall which is visible when the cassette is in place on a recorder, a latch which is pivotable between two positions wherein a plug at one extremity of the latch either blocks or unblocks the record/not record opening at said under wall of the cassette while the other extremity of the latch can either be seen or unseen at the opening in said visible wall of the cassette, depending upon the position to which the latch has been pivoted.

4,875,110

ROTARY HEAD APPARATUS WITH MOTOR MAGNET AND YOKE SURROUNDING MOTOR STATOR COIL

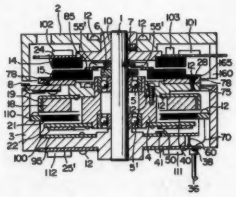
Saburo Kazama, Hiratsuka, and Akira Tamura, Ibaraki, both of Japan, assignors to Hitachi Ltd., Tokyo, Japan

Filed Oct. 8, 1986, Ser. No. 917,068

Claims priority, application Japan, Oct. 9, 1985, 60-223559

Int. Cl.[4] G11B *15/61*

U.S. Cl. 360—64 **15 Claims**



1. A rotary head apparatus comprising:

a hollow upper cylindrical drum;

a hollow lower cylindrical drum forming a pair with said upper drum;

a center shaft for fixedly connecting said upper and lower drums;

rotary head means rotatably received in a hollow space defined by said upper and lower drums and including a plurality of magnetic heads;

bearing means for rotatably supporting said rotary head means around said center shaft;

brushless motor of flat formation type including a stator coil fixed to said hollow lower cylindrical drum and motor magnetic circuit means having a magnet and a cooperating member disposed in opposition to said magnet, said stator coil having a respective coil pole thereof disposed in a plane perpendicular to the rotation axis of said center shaft and said magnet having a respective magnetic pole thereof disposed in a plane perpendicular to the rotation axis of said center shaft, said stator coil being sandwiched between said magnet and said cooperating member and said magnet and said cooperating member being integrally fixed to said rotary head means; and

a rotary transformer mounted between said hollow upper cylindrical drum and said rotary head means, and an opening mounted on a side wall of said hollow upper cylindrical drum for leading outwardly wiring members of said rotary transformer mounted within said hollow upper cylindrical drum.

4,875,111

APPARATUS FOR REPRODUCING A DIGITAL SIGNAL

Kentaro Odaka, Tokyo; Tadashi Fukami, and Shinya Ozaki, both of Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 19, 1987, Ser. No. 87,093

Claims priority, application Japan, Aug. 21, 1986, 61-196020

Int. Cl.[4] G11B *15/14*

U.S. Cl. 360—64 **10 Claims**

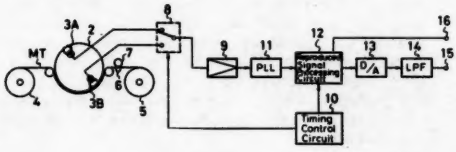
1. Apparatus for reproducing a digital signal recorded in a track formed on a tape by a recording apparatus having rotary

head rotating at a predetermined speed and mounted on a rotary drum having a predetermined diameter, the reproducing apparatus comprising:

a rotary drum;

n rotary heads mounted on the rotary drum, where n is an integer;

driving means for rotating said n rotary heads at a speed at least twice the predetermined rotation speed of the rotary head of the recording apparatus;



guiding means for wrapping the tape on the periphery of the rotary drum with a wrap angle of 360°/n; and

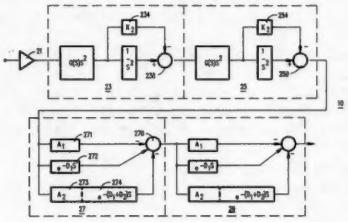
demodulating means connected to the rotary heads and supplied with all digital signals reproduced by said n rotary heads during each rotation of each of the rotary heads and for demodulating the reproduced digital signals.

4,875,112

COMPOUND PULSE DIMMING CIRCUITRY FOR CONDITIONING READBACK SIGNALS

Martin H. Dost; Emil Hopner; Constantin M. Melas, all of Los Gatos, and Lionel D. Provazek, Campbell, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1985, Ser. No. 815,110
Int. Cl.[4] G11B *5/035*
U.S. Cl. 360—65 **23 Claims**



1. Apparatus for conditioning pulse signals representing digital data, said apparatus comprising:

delay line equalizer means for equalizing the pulse signals; and

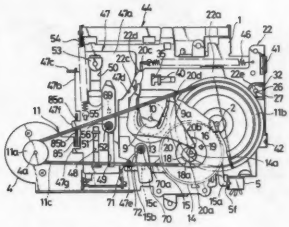
filter equalizer means coupled to said delay line equalizer means for complementally equalizing said pulse signals, and including a first path for filtering the pulse signals and to provide filtered pulses at an output, a second path for feeding forward a signal representing the time derivative of said filtered pulse signals at an output, and combining means for combining the signals at the output of the first and second paths.

4,875,113

AUTOMATIC STOPPING DEVICE FOR A TAPE FEEDING APPARATUS

Tadao Arata, Inagi, Japan, assignor to Tanashin Denki Co., Ltd., Tokyo, Japan

Filed Dec. 28, 1987, Ser. No. 138,915
Claims priority, application Japan, Aug. 14, 1987, 62-124345; Aug. 14, 1987, 62-124346
Int. Cl.[4] G11B *15/48, 15/22;* B65H *59/38*
U.S. Cl. 360—74.2 **19 Claims**



1. An automatic stopping device for a tape feeding apparatus which includes a capstan shaft, a reel shaft, a motor for normally rotating said capstan shaft and said reel shaft, and a switch for interrupting energization of said motor to stop rotation of said capstan shaft and said reel shaft, comprising a turning force transmitting member connected to said motor via said capstan shaft, a pivotal member supporting said turning force transmitting member for rotation thereon and mounted for pivotal motion between an operative position in which transmission of a turning force from said turning force transmitting member to said reel shaft is enabled and an inoperative position in which transmission of a turning force is disabled, said switch being located for operation by said pivotal member so as to deenergize said motor in response to the inoperative position of said pivotal member, means for biasing said pivotal member toward the operative position, frictional coupling means interposed between said turning force transmitting member and said reel shaft, detecting means for detecting stopping of rotation of said reel shaft, operating means on said turning force transmitting member operable when said detecting means detects stopping of rotation of said reel shaft for cooperating with said detecting means to pivot said pivotal member from the operative to the inoperative position, and a movable member mounted for movement between an operative mode position and a rest mode position and operable upon movement thereof from the operative mode position to the rest mode position after stopping of said motor for disabling cooperation between said detecting means and said operating means.

4,875,114

SYSTEM FOR DETECTING A REFERENCE TRACK ON A DISK SURFACE IN A DISC STORAGE UNIT

Eiji Moteki, Kawasaki, Japan, assignor to Fuji Electric Company Ltd., Kawasaki, Japan

Filed Oct. 9, 1987, Ser. No. 106,882
Claims priority, application Japan, Dec. 3, 1986, 61-288008
Int. Cl.[4] G11B *5/596*
U.S. Cl. 360—77.08 **15 Claims**

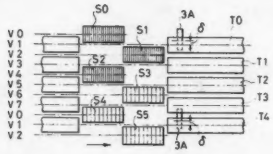
1. A system for detecting a reference track on a disc surface in a disc storage unit wherein the disc surface has a plurality of tracks and servo information for indicating an off-track amount of a position of a read/write head relative to said tracks is written on said disc surface, comprising:

said servo information having first servo information for identifying said reference track of said tracks and second servo information associated with the remaining tracks other than said reference track;

means for reading out said servo information by said read/write head;

means for judging whether the servo information read out is said first servo information or said second servo information; and

means for detecting said read/write head is on said reference track when said means for judging judged said first servo information;



wherein said servo information is written in such a way that said servo information interrupts a part of said track, and that the center of an area onto which said servo information is written is deviated by about one half the distance between said tracks relative to the center of said track, and each servo information is written onto said area in such a way that each successive area is alternately deviated in the longitudinal direction of said track between two adjacent tracks.

4,875,115

DIGITAL SIGNAL TAPE RECORDING/REPRODUCING APPARATUS WITH IMPROVED SERVO CONTROL

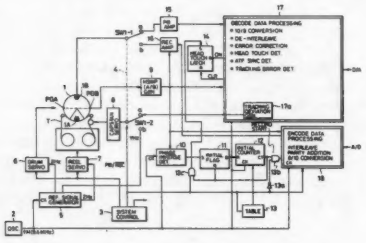
Seiichi Yokosawa, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Sep. 8, 1987, Ser. No. 93,470

Claims priority, application Japan, Sep. 5, 1986, 61-208055; Sep. 5, 1986, 61-208056

Int. Cl.[4] G11B *5/584, 15/467*

U.S. Cl. 360—77.15 **4 Claims**



1. A digital signal reproducing apparatus having at least two rotary heads for reproducing a plurality of signals on a recording medium, said plurality of signals containing digital signals, a tracking pilot signal composed of a low-frequency signal, and a sync signal, wherein said plurality of signals are recorded on each of a plurality of helical tracks in a predetermined format with a recording region in one track being independent of a recording region in another track along a longitudinal direction, positions of the pilot signals recorded on three consecutive tracks differ from one track to another, and different sync signals are recorded in different respective positions on adjacent tracks, each of said rotary heads has a width greater than the width of each track, and upon obtaining amounts of crosstalk between pilot signals of a current track and of two tracks adjacent to the current track being reproduced, said crosstalk amounts being provided at outputs of the respective rotary heads by scanning each of the tracks, a capstan servo is controlled in accordance with a difference between the amounts of crosstalk of the pilot signals that are picked up by said rotary heads from the two tracks adjacent to the current track being reproduced, the improvement comprising:

means for detecting a sync signal;

means for sampling, from output signals of said rotary heads, levels of frequency components of said pilot signals and holding said levels in response to said sync signal detected by said sync detection means;

means for comparing said levels being held in said sampling and holding means with a predetermined level; and

means for deciding whether a difference in level between a level being held in said sampling and holding means and levels of the pilot signal frequency components in the output signals of the respective rotary heads reproduced after a predetermined period of time from the detection of said sync signal by said sync detection means is supplied to said capstan servo as a signal representative of an amount of track deviation.

4,875,116

TRANSDUCER POSITION CONTROL SYSTEM FOR DATA TRANSFER APPARATUS EMPLOYING DISKLIKE RECORD MEDIA

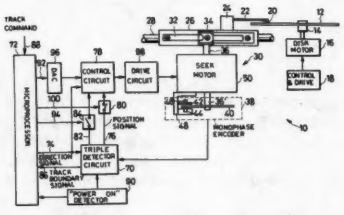
Kazuhiko Yasuda, Fussa, and Sumio Wada, Koga, both of Japan, assignors to Teac Corporation, Tokyo, Japan

Filed Feb. 9, 1988, Ser. No. 153,999

Claims priority, application Japan, Feb. 19, 1987, 62-37414

Int. Cl.[4] G11B *5/596*

U.S. Cl. 360—78.11 **7 Claims**



1. In an apparatus for data transfer with a disklike record medium having a multiplicity of concentric data tracks formed thereon with a predefined pitch, there being a centerline on each data track and boundaries between the data tracks, in combination:

(a) means for imparting rotation to the record medium;

(b) a transducer for data transfer with the record medium;

(c) positioning means including an electric seek motor for transporting the transducer across the data tracks on the record medium in order to position the transducer on any desired track;

(d) an encoder comprising:

(1) a fixed member having an aperture defined therein;

(2) a movable member disposed opposite the fixed member and bidirectionally movable relative to the fixed member in step with the transducer, the movable member having defined therein a multiplicity of equally spaced apertures, with nonapertured parts intervening therebetween, which are arranged in a row in the direction of the movement of the movable member, each aperture of the movable member being defined in part by a pair of opposed side edges of the movable member extending across the direction of the movement of the movable member, each aperture and each nonapertured part of the movable member having a centerline extending across the direction of the bidirectional movement of the movable member, the dimensions of each aperture and each nonapertured part of the movable member as measured substantially in the direction of the movement

of the movable member being equal to each other and to the pitch of the data tracks on the record medium, the movable member and the record medium being in prescribed phase relation to each other such that the centerlines of the apertures and nonapertured parts of the movable member correspond to the boundaries of the data tracks on the record medium and the side edges of the apertures correspond to the centerlines of the data tracks;

(3) a light source; and

(4) a photodetector to be irradiated by the light source when each aperture in the movable member comes into register with the aperture in the fixed member, the photodetector providing an electric output which varies in magnitude depending upon the intensity of irradiation by the light source;

(e) a detector circuit connected to the photodetector of the encoder for deriving from its output a transducer position signal indicative of the position of the transducer with respect to the data tracks on the record medium; the detector circuit comprising:

(1) a phase inverter circuit connected to the photodetector of the encoder;

(2) a comparator having an input connected directly to the photodetector and another input connected to the phase inverter circuit for providing an output indicative of the results of comparison between the two inputs;

(3) a track boundary detector circuit connected to the photodetector for providing a series of track boundary pulses representative of the boundaries between the data tracks on the record medium;

(4) flip flop circuit means connected to the comparator and to the track boundary detector circuit for latching the output from the comparator on being clocked by the track boundary pulses and for providing first and second outputs having a phase difference of 180 degrees;

(5) a first position signal switch connected to the photodetector for passing the output therefrom when actuated by the first output from the flip flop circuit means;

(6) a second position signal switch connected to the phase inverter circuit for passing the output therefrom when actuated by the second output from the flip flop circuit means; and

(7) output circuit means for combining the outputs from the first and second position signal switches to provide the transducer position signal, and

(f) control circuit means connected to the detector circuit and to the seek motor of the positioning means for controlling the seek motor in response to the transducer position signal in order to position the transducer on any desired data track on the record medium in centerline alignment therewith.

4,875,117

DIGITAL HEAD POSITIONER ASSEMBLY

Arnold Slezak, Newbury Park, and Lloyd Levy, Northridge, both of Calif., assignors to Micropolis Corporation, Chatsworth, Calif.

Continuation-in-part of Ser. No. 113,614, Oct. 26, 1987, Pat. No. 4,796,122, which is a continuation-in-part of Ser. No. 944,466, Dec. 19, 1986, Pat. No. 4,754,353. This application Dec. 29, 1988, Ser. No. 291,695

Int. Cl.[4] G11B *5/55, 17/02, 21/08*

U.S. Cl. 360—98.01 **19 Claims**

1. A Winchester type digital storage system comprising:

a plurality of hard storage disks spaced apart from one another and mounted coaxially, said disks having magnetizable surfaces;

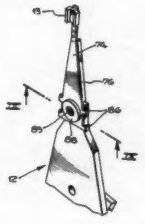
means for rotating said storage disks;

a plurality of magnet heads for reading and writing digital information on the surfaces of said disks;

head positioning means for mounting said heads in proximity to the surfaces of said disks, and for shifting the position of said heads across said disks, said head positioning means including individual spring load beam mounting means for each head, and a main rotable integral metal positioner body member, said integral metal positioner member having a central opening;

bearing means engaging said central opening for rotatably mounting said positioner member about a central axia;

said positioner body member including rigid integral arms extending outwardly to support said spring mounting means, said integral arms and said body member being a single homogeneous structure free of any joints;



the outward extent of said rigid arms from said central axis being substantially greater than the length of said spring mounting means; and

said load beam mounting means having holes at their inner ends overlying said arms, and being secured to the ends of said arms by mounting plates overlying said holes, with material from said mounting plates extending through the holes in said load beam means and into rigid bonding engagement with said arms.

4,875,118

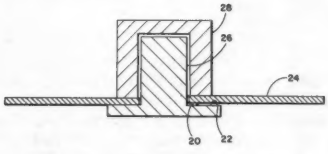
REDUCING HARMFUL RUNOUT IN A RIGID MAGNETIC DISK THROUGH USE OF SHIMS

Farid Kaymaram, Cambridge, Mass., assignor to Magnetic Peripherals Inc., Minneapolis, Minn.

Filed Apr. 4, 1988, Ser. No. 176,968

Int. Cl.[4] G11B *17/02*

U.S. Cl. 360—99.12 **2 Claims**



1. In a magnetic disk drive having a drive spindle and a disk support supporting a rigid magnetic disk and a clamp pressing said magnetic disk against said disk support, the improvement comprising a sized shim sandwiched between said magnetic disk and said disk support adjacent said disk spindle at a single location about a segment of the circumference of said disk spindle, said sized shim having a thickness sized as to form a substantially smooth sinusoidal circumferential profile to said magnetic disk.

4,875,119
HEAD LOADING MECHANISM FOR FLEXIBLE DISC DRIVE

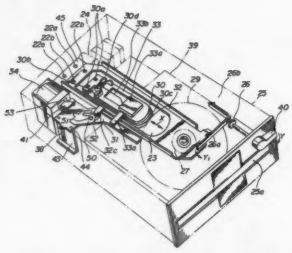
Yashiko Ando, Tachikawa; Yasushi Noda, Tokyo, and Yohji Abe, Kiyose, all of Japan, assignors to Teac Corporation, Tokyo, Japan

Filed Mar. 2, 1988, Ser. No. 162,999

Claims priority, application Japan, Mar. 3, 1987, 62-30912[U]; Mar. 3, 1987, 62-30913[U]; Mar. 5, 1987, 62-32474[U]

Int. Cl.[4] G11B 5/54

U.S. Cl. 360—105 14 Claims



1. A head loading mechanism for a flexible disc drive unit, for bringing into contact and withdrawing a magnetic read/write head with and from a flexible magnetic disc, comprising:

disc loading means rotatably supported in the disc drive unit, for positioning the magnetic disc at a fixed position where the magnetic disc is rotatably held;

head loading means rotatably supported in the disc drive unit, for carrying the magnetic head;

head load bail means rotatably supported in the disc drive unit, for positioning the magnetic head over the magnetic disc with a gap (g_1) in a state where the bail means makes contact with the head loading means;

bail urging means for urging the bail means in a direction in which contact is made between the bail means and the head loading means so that the magnetic head is withdrawn from the magnetic disc;

driving means for driving the bail means to be disengaged from the head loading means against a force due to the bail urging means to bring the magnetic head into contact with the magnetic disc; and

adjusting means for adjusting a rotational position of the bail means with respect to the head loading means so that the gap (g_1) is varied,

the adjusting means being mounted on the bail means to rotate together with the bail means and engaging with the disc loading means so as to determine the rotational position of the bail means with respect to the head loading means.

4,875,120
HEAD DRIVING APPARATUS WITH COARSE AND FINE ADJUSTMENTS

Kiyoshi Takahashi, Tokyo, and Masayuki Noda, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 16, 1988, Ser. No. 232,780

Claims priority, application Japan, Aug. 18, 1987, 62-204334; Oct. 31, 1987, 62-167547[U]

Int. Cl.[4] G11B 5/54

U.S. Cl. 360—106 10 Claims

2. A head driving apparatus for displacing a head to record on and/or to reproduce from recording mediums, the head driving apparatus comprising:

a lead screw to which the head is movably attached;

a first motor rotatively driving the lead screw to coarsely displace the head;

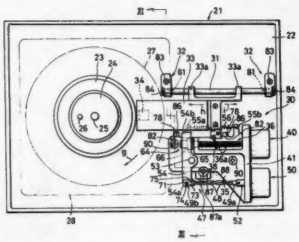
a plurality of slender rods, affixed at respective ends to one another;

a second motor for turning one end of the affixed slender rods;

urging means for applying a force to urge the other end of the affixed slender rods in a direction of stretching the slender rods;

holding means for holding the other end of the affixed slender rods proximal the urging means in a nonrotatable state; and

fine drive means for finely displacing the lead screw in the



axial direction thereof, the fine drive means being connected to the other end of the affixed slender rods proximal the urging means,

whereby the head is coarsely displaced due to rotation of the lead screw driven by the first motor, and finely displaced in the axial direction of the lead screw due to fine displacement of the lead screw by the fine drive means connected to the affixed slender rods, when the one end of the affixed slender rods is turned by the second motor to intertwine the slender rods with one another and the other end of the affixed slender rods is finely displaced against the force of the urging means.

4,875,121
MAGNETIC HEAD SUPPORTING DEVICE

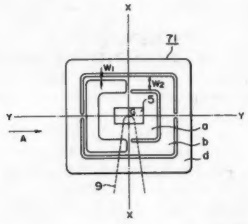
Yoshito Tanaka, and Nobuhiro Umebayashi, both of Ibaraki, Japan, assignors to Hitachi Maxell, Ltd., Ibaraki, Japan

Filed May 8, 1987, Ser. No. 47,154

Claims priority, application Japan, May 12, 1986, 61-109161

Int. Cl.[4] G11B 5/56, 21/24

U.S. Cl. 360—129 4 Claims



1. A magnetic head supporting device for supporting at least one magnetic head making contact with a flexible magnetic disk so as to record and reproduce signals on and from said flexible magnetic disk in a running direction, said magnetic supporting device comprising:

a gimbal spring having one surface side near to said flexible magnetic disc and another surface side remote from said flexible magnetic disc and further having a central portion

with a center point to which said magnetic head is secured on said one surface side; and

a pivot making contact with said center portion on said another surface side so as to support said magnetic head through said gimbal spring;

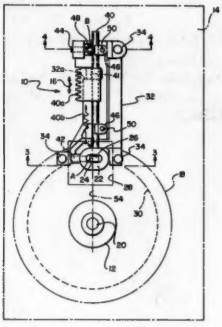
wherein said gimbal spring includes an intermediate frame portion which supports said central portion in such a manner as to impart thereto a degree of freedom of rotation about a first axis passing through said center point orthogonally to said running direction and which has a first portion upstream of said first axis as viewed in the running direction and a second portion downstream of said first axis, said intermediate frame portion having a shape symmetric with respect to a second axis passing through said center point and extending orthogonally to said first axis; and an outer holding portion which supports said intermediate frame portion in such a manner as to impart thereto a degree of freedom of rotation about said second axis, the width of said first portion of said intermediate frame portion, measured along said first axis, being larger than the width of said second portion so that intermediate frame portion is asymmetrical with respect to said first axis such that said gimbal spring has a greater spring stiffness downstream of said first axis than upstream of said first axis as views in the running direction to prevent lifting of the magnetic head from the flexible magnetic disc.

4,875,122

HEAD TRANSPORT ASSEMBLY HAVING SIMPLIFIED MUTUALLY INDEPENDENT POSITIONAL ADJUSTMENTS

Steven D. Daniels, Churchville; Daniel C. Maslanka, and John E. Morse, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 14, 1988, Ser. No. 167,679
Int. Cl.[4] G11B 5/56
U.S. Cl. 360—109 **8 Claims**



1. A transport assembly for supporting a transducer in relation to a recording medium mounted for rotation on a drive motor and for moving the transducer through a path intersecting a spindle of the drive motor, said assembly comprising:

a transport for supporting the transducer relative to a first adjustment point and a second adjustment point outboard of said first adjustment point in relation to the motor spindle;

means for supporting said transport for movement along a guide path that is generally parallel to the path intersecting the drive motor, said adjustment points being proximate said guide path;

means acting upon the first adjustment point for pivoting said transport about said second adjustment point thereby to intersect the transducer with the path intersecting the drive motor; and

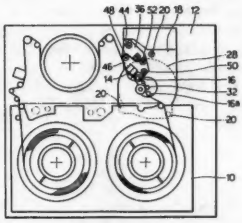
means acting upon the second adjustment point for pivoting said transport about said first adjustment point thereby to set the azimuth of the transducer.

4,875,123

ADJUSTABLE AUDIO CONTROL-ERASER AND TAPE GUIDE ASSEMBLY FOR A CASSETTE TAPE VIDEO TAPE RECORDER

Sung S. Kang, Suwon, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea

Continuation of Ser. No. 939,959, Dec. 10, 1986, abandoned.
This application Jan. 17, 1989, Ser. No. 298,270
Claims priority, application Rep. of Korea, Dec. 10, 1985, 16527/1985
Int. Cl.[4] G11B 5/56
U.S. Cl. 360—109 **1 Claim**



1. An adjustable audio control eraser and tape guide assembly for a cassette type video recorder which comprises:

a housing having a main base plate;

a tape cassette disposed on the front portion of said main base plate; and

an audio control eraser and tape guide assembly disposed on the rear portion of said main base plate, said assembly including:

a printed circuit board supported on said main base plate,

a motor member underlying said printed circuit board, said motor member having a rotator and a stator attached thereto,

a stator yoke attached to said printed circuit board,

an elongated member passing through said stator yoke, said printed circuit board, and said stator and attached to said stator,

a head base connected to said stator yoke through a bushing by a first connection device at a first end portion of said head base and to a stator yoke flange disposed on said stator yoke by a second connection device at a second end portion of said head base, said stator yoke flange being provided with a first tape guide and a second tape guide one of said tape guides being disposed on each end portion of said stator yoke flange, respectively, said head base having elongated openings at said first and second end portions thereof through which said respective first and second connection devices pass,

a head plate having an adjustable audio control eraser head member disposed thereon said head plate being connected to said head base by first, second, and third screws, said first screw having a coil spring wound around an upper portion thereof for biasing said head plate with respect to said head base, and said second and third screws coacting with said first screw for movement of said head plate with said audio control eraser head member, upon tightening or loosening of the second or third screws,

a trigonal pyramide shaped protrusion integrally formed on said head base for inclining said audio control eraser head member with respect to said first screw by tightening or loosening said second and third screws, and

a rectangular opening disposed on said head base and aligned with a hole disposed on said stator yoke for adjusting said head base along with the head plate and audio control eraser head member by applying a rotational force thereto, said head base, head plate and audio control eraser head member being moved in a generally horizontal direction during the adjusting after said first and second connection devices are loosened and the rotational force is applied, said elongated openings in said head base accommodating movement of said head base whereafter said first and second connection devices are tightened to restrain further movement of said head base, whereby the assembly provides for a slim type cassette type video recoder and for ready adjustment in positioning of said audio control eraser head member.

4,875,124

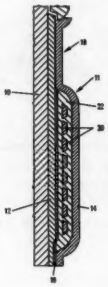
THIN FILM MAGNETIC HEADS WITH THERMALLY CROSSLINKED INSULATION

Heidi L. Dickstein, Morgan Hill; Hiroyuki Hirasoka, Saratoga, and James H. Lee, San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 141,738, Jan. 11, 1988, abandoned. This application Apr. 18, 1988, Ser. No. 182,535

Int. Cl.[4] G11B *5/16*

U.S. Cl. 360—126 **6 Claims**



1. A thin film magnetic head characterized in that the electrical insulation which surrounds the conductive coil comprises a photosensitive resin which has been crosslinked by a thermally activated crosslinking agent or promotor.

4,875,125

TAPE HEAD CLEANER CARTRIDGE

Kyriacos Joannou, Wayland; Kenneth Wilson, Lexington, and Alan B. Lowry, Canton, all of Mass., assignors to Pericomp Corporation, Natick, Mass.

Filed Oct. 14, 1987, Ser. No. 108,062

Int. Cl.[4] G11B *5/41*

U.S. Cl. 360—128 **28 Claims**

1. A tape head cleaner cartridge adapted for receipt in a tape machine having a magnetic tape head that is supported for tape travel thereby, said cartridge comprising:

a cartridge housing having front and rear walls,

a cleaning pad,

a pad support and actuating lever having separate support and actuating ends,

means pivotally supporting said lever in the cartridge housing,

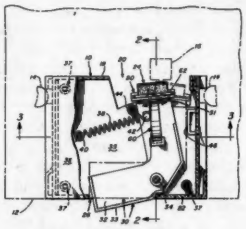
said means pivotally supporting said level providing motion of said lever support end in the tape travel direction;

means at the lever support end for supporting said cleaning pad adjacent said front wall

said cartridge housing front wall having means defining an access opening to permit positioning of said cleaning pad for contact with said tape head,

said cartridge housing rear wall having means defining an aperture for receiving at least part of the lever actuating end,

means disposed in the cartridge housing for biasing the lever



is a direction generally parallel to said tape travel direction whereby said lever is predisposed to move to a first position,

said actuating end of the lever being capable of manual manipulation to a second position whereby the cleaning pad transitions across the tape head in the direction of tape travel between said first and second positions.

4,875,126

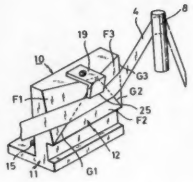
STATIONARY TAPE GUIDE FOR A MAGNETIC TAPE RECORDER

Niro Nakamichi, Kodaira, Japan, assignor to Nakamichi Corporation, Tokyo, Japan

Filed Feb. 10, 1988, Ser. No. 154,265

Int. Cl.[4] G11B *15/60*

U.S. Cl. 360—130.23 **13 Claims**



1. A stationary tape guide for guiding a magnetic tape withdrawn from a tape cassette and securing said tape in close proximity to a helical scanning cylinder, said guide comprising:

(a) a block having, on its front face which confronts said tape, a laterally extending guide path the contour of which includes a first straight guide projection inclined with respect to a horizontal reference plane which first projection is forwardly convexed toward said tape; and

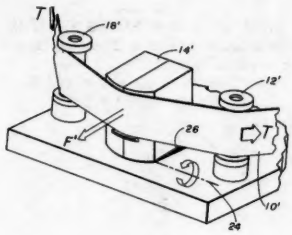
(b) said block being integrally provided with a second straight guide projection inclined with respect to said reference plane and a single orthogonal guide projection extending orthogonal to said reference plane said first, second, and orthogonal projections lying in series along said guide path.

4,875,127

APPARATUS AND METHOD FOR PRECISE TAPE GUIDING IN A MAGNETIC TAPE TRANSPORT

Richard J. McClure, San Diego, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 6, 1988, Ser. No. 178,400
Int. Cl.[4] G11B *15/60*
U.S. Cl. 360—130.21 5 Claims



1. An improved apparatus for transporting a magnetic tape wherein the plane of said magnetic tape is perpendicular to a reference plane having a magnetic transducer fixedly mounted thereon, said transducer further having a surface adapted for contacting said tape, said improved apparatus comprising:

a. means for positioning said transducer to fix said surface at an angle substantially equal to 0.5 degrees with respect to a line perpendicular to said reference plane, whereby a force component urges said tape axially along said transducer surface, and

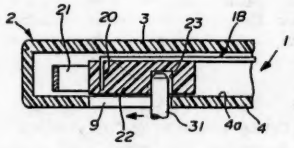
b. tape support means integral with said transducer, whereby said tape is restrained from further axial movement along said transducer surface.

4,875,128

DISC CARTRIDGE

Vurnen Leonard; Arthur K. Kato; Kiyoshi Ohmori; Keisuke Fujiwara, and Yutaka Soda, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn. and Sony Corporation, Tokyo, Japan

Filed Jul. 11, 1988, Ser. No. 217,440
Int. Cl.[4] G11B *23/03*
U.S. Cl. 360—133 5 Claims



1. A disc cartridge adapted for insertion in a disc drive including a release pin, the cartridge comprising:

a cartridge body including an upper shell and a lower shell having a long and nnarrow receiving opening for receiving said release pin of said disc drive unit;

a disc rotatably housed in said cartridge;

a disc restraint disposed betweenn said disc and said upper shell for restraining said disc with respect to said cartridge when said release pin is in a first position and releasing said disc for rotation within said cartridge when said release pin is in a second position; and

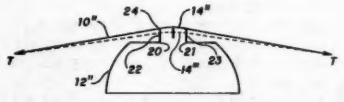
a cover attached to said restraint for engaging said release pin and moving said restraint in response to movement of said release pin, said cover further closing said receiving opening to prevent the entrance of contaminants into said cartridge when said release pin is in either of said first or second positions and when said release pin is in motion between said first and said second positions.

4,875,129

INLINE MAGNETIC HEAD ASSEMBLY FOR USE IN A CASSETTE LOADED RECORDER

John M. Favrou, Del Mar, Calif.; Christopher A. Lacey, Willimantic, Conn., and George W. Brock, La Jolla, Calif., assignors to Eastman Kodak Co., Rochester, N.Y.

Continuation of Ser. No. 138,764, Dec. 28, 1987, abandoned.
This application Nov. 21, 1988, Ser. No. 274,507
Int. Cl.[4] G11B *5/22*
U.S. Cl. 360—122 5 Claims



1. In a recording system including first and second magnetic head assemblies, the improvement comprising:

a. means for transporting a recording medium over said first and said second magnetic head assemblies in sequence, said means including a span of said medium between said first and said second head assemblies,

b. first transducing element and second transducing element located on first and second lands of said first and said second head assemblies respectively,

c. means external to said first and to said second magnetic head assemblies for guiding said recording medium at nominal wrap angles relative to said first and said second transducing elements,

d. said first magnetic head assembly further comprising

a first pair of outriggers for contacting said recording medium before said recording medium contacts said first land having said first transducing element located thereon, wherein at least one of said first pair of outriggers contacts said medium,

a second pair of outriggers for contacting said recording medium after said recording medium contacts said first land having said first transducing element located thereon, wherein at least one of said second pair of outriggers supports one end of said span of said medium,

e. said second magnetic head assembly further comprising

a third pair of outriggers for contacting said recording medium before said recording medium contacts said second land having said second transducing element located thereon, wherein at least one of said third pair of outriggers supports the other end of said span of said medium,

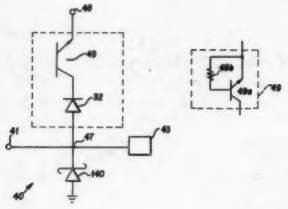
a fourth pair of outriggers for contacting said recording medium after said recording medium contacts said second land having said second transducing element located thereon, wherein at least one of said fourth pair of outriggers contacts said medium,

wherein said first pair of outriggers, said first land, and said second pair of outriggers comprise the contour of a first constant area profile, and said third pair of outriggers, said second land, and said fourth pair of outriggers comprise the contour of a second constant area profile.

4,875,130
ESD LOW RESISTANCE INPUT STRUCTURE

Jeff Huard, Puyallup, Wash., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Jul. 6, 1988, Ser. No. 215,865
Int. Cl.[4] H02H 9/04
U.S. Cl. 361—56 23 Claims

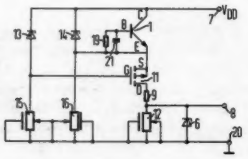


1. A circuit comprising:
an input terminal for receiving an input signal;
a first supply terminal for receiving a first supply voltage;
a second supply terminal for receiving a second supply voltage; and
a first clamp circuit for clamping the voltage level on said input terminal to a voltage in excess of said first supply voltage, thereby preventing said voltage level from exceeding a predefined magnitude in a first polarity defined by said first supply voltage minus said second supply voltage, said first clamp circuit being connected between said input terminal and said first supply terminal, said first clamp circuit comprising a reduced beta bipolar transistor having a first current handling terminal connected to said first supply terminal and a second current handling terminal connected to said input terminal.

4,875,131
CIRCUIT CONFIGURATION FOR MONITORING A SEMICONDUCTOR STRUCTURAL ELEMENT AND PROVIDING A SIGNAL WHEN THE TEMPERATURE EXCEEDS A PREDETERMINED LEVEL

Ludwig Leipold; Rainald Sander; Jenoe Tihanyi, and Roland Weber, all of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 25, 1989, Ser. No. 342,835
Claims priority, application Fed. Rep. of Germany, Aug. 11, 1988, 3816259
Int. Cl.[4] H02H 5/04
U.S. Cl. 361—103 6 Claims

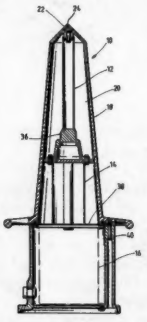


1. A circuit for monitoring the temperature of a semiconductor structural element and providing a signal when the temperature exceeds a preset limit, the circuit includes a bipolar transistor connected thermally to the semiconductor structural element, and a first current source connected in series to the bipolar transistor, the improvement comprising:
a MOSFET, wherein the source of the mosfet is coupled to the emitter of the bipolar transistor and the drain of the MOSFET is coupled to the current source;
a Zener diode for maintaining the gate of the MOSFET at a first potential; and
a second Zener diode for maintaining the source of the MOSFET at a second potential, the difference between the first potential and the second potential at the operating temperature of the semiconductor structural element being smaller that the threshold voltage of the MOSFET.

4,875,132
ANTENNA GROUNDING SYSTEM

James E. Olivenbaum, Houston, Tex., assignor to Tideland Signal Corporation, Houston, Tex.

Filed Nov. 3, 1988, Ser. No. 266,541
Int. Cl.[4] H02H 9/04
U.S. Cl. 361—117 5 Claims



1. A lightning protected antenna comprising,
at least one metallic antenna,
an electronic housing containing electrical power and controls positioned below said antenna,
a non magnetic, electrically non-conductive enclosure surrounding said antenna and housing,
a metal tip on the top of the enclosure,
a first electrically conductive lead connected between the tip and said antenna,
a second electrically conductive lead connected to the antenna and extending through the enclosure at a position below the antenna for connection to ground, wherein said first and second conductive leads include spring biased contacts, and said first and second conductive leads are in electrical communication with the antenna at the ends of the antenna.

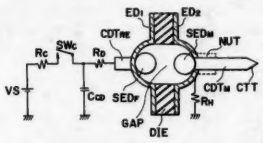
4,875,133
SIMULATING STATICELECTRICITY DISCHARGES

Takeyoshi Kawamura, Yokohama, Japan, assignor to Sanki Electronic Industry Co., Ltd., Yokohama, Japan

Filed Mar. 11, 1986, Ser. No. 838,387
Claims priority, application Japan, Mar. 12, 1985, 60-049733
Int. Cl.[4] H05F 3/04; G01R 29/12
U.S. Cl. 361—230 19 Claims

1. An apparatus for simulating electrostatic discharge, comprising:
(a) first means for applying an electrostatic discharge substantially equivalent to that generated by an electrified human body to an object to be tested, the first means comprising a first electrostatic capacitor and third means including a space defining a gap for supplying energy built up in said first electrostatic capacitance element to said object to be tested via a first resistor and via said gap across which the electrostatic discharge occurs; and
(b) second means for shortening the rise time of the discharge current of the electrostatic discharge from said

first means and increasing the peak value of the discharge current, said second means comprising a second electrostatic capacitance element connected across said gap for charging a given amount of electric charge across said gap



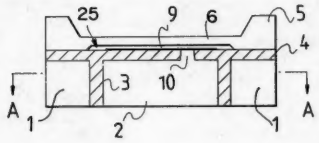
and discharging the given amount of electric charge across said gap before said third means supplies the energy accumulated by the first electrostatic capacitance element to the object to be tested.

4,875,134

PRESSURE SENSOR CONSTRUCTION AND METHOD FOR ITS FABRICATION

Heikki Kuisma, Helsinki, Finland, assignor to Vaisala Oy, Helsinki, Finland

Filed Jan. 9, 1989, Ser. No. 294,799
Claims priority, application Finland, Jan. 18, 1988, 880206
Int. Cl.[4] H04G 7/00; G01L 9/12
U.S. Cl. 361—282 **8 Claims**



1. A capacitive pressure sensor construction comprising

a base part (1, 2, 4), comprising a planar, electrically conductive silicon layer (1, 2) and a thereupon permanently bonded planar intermediate layer (4) of an insulating material, e.g., glass, with an essentially smaller thickness than that of the silicon layer (1, 2),

a fixed planar capacitor electrode (9) fabricated on the base part (1, 2, 4), and

a deflecting membranous capacitor electrode (6) fabricated of silicon and essentially integral with a surrounding, essentially thicker base element (5), and gappedly spaced from and aligned at least approximately coincident with the fixed capacitor electrode (9), so that a hermetically sealed chamber (25) remains between the fixed electrode (9) and the membranous electrode (6),

characterized in that

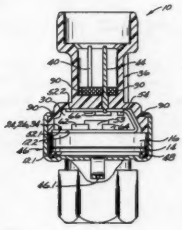
the base part (1, 2, 4) is perpendicularly divided into areas (1, 2) galvanically isolated from each other, namely to a contact area (2), which is coincident with the fixed capacitor electrode (9), galvanically connected to said electrode and designed with an area maximally equal to that of said electrode, and to at least one bonding area (1), which is isolated from the contact area (2) by an insulating layer (3) and to which a bonding voltage can be applied during the anodic bonding process in order to bond the base part to the base element (5) of the membranous capacitor electrode.

4,875,135

PRESSURE SENSOR

Robert P. Bishop, Carver, Mass.; Anthony J. Sabetti, Greenville, R.I., and Thomas Charboneau, Plainville, Mass., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 2, 1988, Ser. No. 278,877
Int. Cl.[4] H01G 7/00
U.S. Cl. 361—283 **8 Claims**



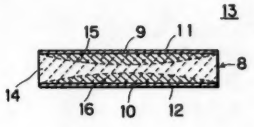
1. A pressure sensor comprising a capacitive pressure transducer having a surface to be exposed to an applied pressure to provide a capacitance which varies with the applied pressure and having transducer terminals disposed at an opposite surface, a connector body having connector terminals thereon, a housing securing the connector body to the transducer in overlying relation to said opposite transducer surface for forming a chamber therebetween, and an electrical circuit disposed in the chamber electrically connected to the transducer and connector terminals for providing an electrical signal corresponding to the applied pressure, the electrical circuit including a flexible substrate having one end portion disposed in overlying relation to said opposite transducer surface mounting electrical circuit components electrically connected to the transducer terminals and having an opposite end portion folded over said one end portion mounting circuit paths thereon electrically connected to the connector terminals.

4,875,136

CERAMIC CAPACITOR AND METHOD OF MANUFACTURING THE SAME

Harunobu Sano; Yukio Sakabe, both of Kyoto, and Goro Nishioka, Hyogo, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Aug. 31, 1988, Ser. No. 239,188
Claims priority, application Japan, Sep. 3, 1987, 62-221652; Oct. 6, 1987, 62-253377; Oct. 6, 1987, 62-253378
Int. Cl.[4] H01G 4/10, 7/00
U.S. Cl. 361—321 **15 Claims**



1. A ceramic capacitor comprising:

a ceramic body obtained by firing, in a reducing atmosphere, a ceramic composition which is not made semiconductive upon firing in a reducing atmosphere; and

at least a pair of capacitance extracting electrodes which are opposite to each other and enclose at least a part of said ceramic body therebetween, said electrodes containing a base metal,

said part of said ceramic body held between said pair of capacitance extracting electrodes including a dielectric

layer and also including a semiconductive portion which is in contact with at least one surface of said dielectric layer and at least one of said pair of capacitance extracting electrodes,

said semiconductive portion being obtained by diffusing a reducing agent in a stage at which said ceramic body is fired.

4,875,137

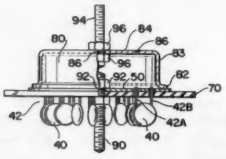
UNIFORM CURRENT AND VOLTAGE DISTRIBUTION DEVICE

Robert D. Rozanski, Huntington Beach; James R. Medlock, III, West Covina, and Stephen F. Larson, La Habra Heights, all of Calif., assignors to L.E.A. Dynatech, Santa Fe Springs, Calif.

Filed Jan. 10, 1989, Ser. No. 295,379

Int. Cl.[4] H02B *1/00*; H05K *1/16*

U.S. Cl. 361—331 **21 Claims**



1. A uniform current and voltage distribution device comprising:

first terminal means;

second terminal means;

first electrical bus means electrically connected to said first terminal means;

second electrical bus means electrically isolated from said first electrical bus means and electrically connected to said second terminal means; and

a plurality of electrical circuit components connected between said first and second bus means so as to form a plurality of circuit paths of equal length, each circuit path running between said first terminal means, said first electrical bus means, a corresponding one of said electrical components, said second electrical bus means, and said second terminal means.

4,875,138

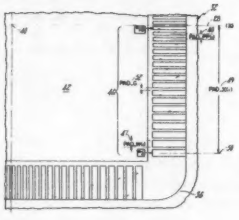
VARIABLE PITCH IC BOND PAD ARRANGEMENT

Michael D. Cusack, Monument, Colo., assignor to United Technologies Corporation, Hartford, Conn.

Continuation-in-part of Ser. No. 920,632, Oct. 20, 1986, Pat. No. 4,753,820. This application Jun. 24, 1988, Ser. No. 210,900

Int. Cl.[4] H05K *01/18*

U.S. Cl. 174—52.4 **7 Claims**



1. A ceramic package comprising:

a ceramic substrate of ceramic having a shrinkage tolerance during firing;

a plurality of spaced bond pads for registration with an electric circuit module;

a selected alignment point associated with said bond pads;

said bond pads having varying widths increasing incrementally from a minimum width adjacent to said alignment point through a plurality of spaced pads beyond the pad closest to said alignment point to a maximum width for the pad located furthest from said alignment point.

4,875,139

BUILDING BLOCK LSI

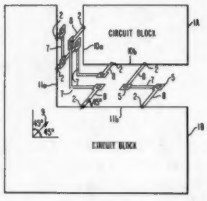
Masahiro Fukui, Matsubara, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 10, 1987, Ser. No. 131,006

Claims priority, application Japan, Dec. 16, 1986, 61-299482

Int. Cl.[4] H05K *1/18*

U.S. Cl. 361—410 **3 Claims**



1. A building block LSI comprising:

a plurality of circuit blocks;

an L-shaped channel formed between adjacent said circuit blocks, said L-shaped channel extending in two different directions from a corner portion of said L-shaped channel, and said two different directions defining a first angle therebetween;

a first set of wires disposed in said L-shaped channel and extending in said different directions;

a second set of wires extending at a second angle from said circuit blocks into said L-shaped channel, said second angle being half that of said first angle;

wherein said first set of wires and said second set of wires are connected such that said adjacent circuit blocks are interconnected electrically.

4,875,140

SUPPORT FOR PRINTED CIRCUIT BOARDS

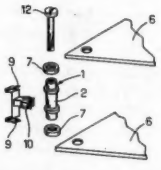
Guy Delpech, Ballainvilliers, and Gilles Garnier, Fontenay-le-Fleury, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 12, 1988, Ser. No. 188,528

Claims priority, application France, May 6, 1987, 8706394

Int. Cl.[4] H05K *1/18*

U.S. Cl. 361—412 **5 Claims**



1. A support for printed circuit boards formed by a column comprising at least one base on which a circuit board is to be supported, a collar for insertion in a hole in the circuit board, and a coupling member, wherein a damper can be inserted

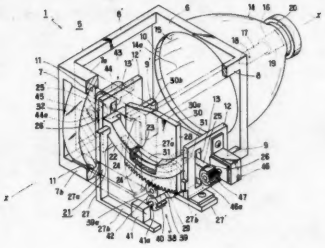
between said base and said circuit board, the compression of said damper being ensured by said coupling member which includes clip means for clipping said coupling member to said circuit board by engaging both the upper and the lower surface of said board, said coupling member including additional means for engaging part of said column.

4,875,141

HEADLIGHT FOR VEHICLE

Shizuya Miyauchi, and Kiyoshi Wada, both of Shimizu, Japan, assignors to Koito Seisakusho Co., Ltd., Shizuoka, Japan

Filed Dec. 21, 1987, Ser. No. 138,544
Claims priority, application Japan, Dec. 20, 1986, 61-304632
Int. Cl.[4] B60Q *1/04*
U.S. Cl. 362—61 **8 Claims**



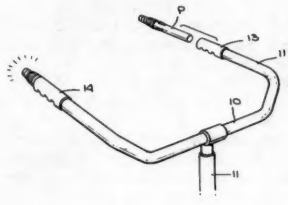
1. A headlight for use in a vehicle and comprising a lamp body, a reflective mirror mounted in the lamp body and having a front opening, a bulb mounted in the reflective mirror and acting as the light source of the headlight, a douser plate mounted on the lamp body at the location between the front opening of the mirror and the bulb and intercepting a part of the light emitted from the bulb, means for supporting the douser plate on the lamp body such that the douser plate can incline transversely with respect to the lamp body, and driving means provided on the lamp body for transversely inclining the douser plate.

4,875,142

BICYCLE SAFETY LIGHTS

Donald Spector, 380 Mountain Rd., Union City, N.J. 07087

Filed Apr. 1, 1986, Ser. No. 846,892
Int. Cl.[4] B62J *6/00*; F21L *7/00*
U.S. Cl. 362—72 **7 Claims**



1. Self-contained starboard and port light units receivable in the back-swept hollow, open-ended arms of a bicycle handlebar to provide light signals hat are highly visible to drivers of vehicle to the rear of the bicyclist, each unit comprising:

A. a tubular battery case molded of synthetic plastic material having exterior wedging means constituted by tapered ribs forming wedging elements adapted to wedge the case into a handlebar arm, whereby the case is securely held therein, said case having a front end that projects from the open end of the arm;

B. at least one cylindrical battery cell in said case whose positive pole is exposed at the front end of the case, and whose negative pole is connected to a fixed switch contact at the end of the front end of the case; and

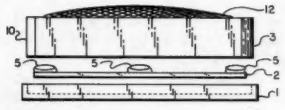
C. a rotatable beacon assembly removably coupled to the front end of the case, said assembly including a tubular mounting supporting a lens, and a light bulb disposed in the mounting whose center terminal engages the negative pole of the battery cell and whose base terminal is connected to a movable contact such that when the assembly is rotated to a given angular position, the movable contact engages the fixed contact to supply power to the bulb, said bulb being trapped in the assembly whereby to replace the bulb, the assembly is decoupled from the case which remains wedges in the arm; said mounting being provided with an externally-threaded shank, the front end of the case being externally threaded, and a union coupling the shank to the front end of the case.

4,875,143

ROTATING LIGHT CIRCUIT AND SPEAKER COVER

Robert Fernandez, 1345 NW. 130th St., North Miami, Fla. 33167

Continuation-in-part of Ser. No. 76,898, Jul. 23, 1987, abandoned. This application Feb. 6, 1989, Ser. No. 306,462
Int. Cl.[4] F21V *33/00*
U.S. Cl. 362—86 **18 Claims**



1. A rotating light circuit and speaker cover apparatus comprising:

an audio signal permeable grid;

a frame circumscribing and attached to a periphery of the grid;

a plurality of lighting means in luminous energy communication with, and disposed beneath, the frame to selectively emit light at least partially transmitted through said frame;

a counter in electrical communication with each of the lighting means to selectively energize and de-energize same in a predetermined sequence, said counter mounted in proximity to the lighting means beneath the frame;

a clock generating electrical pulses which are electrically communicated to the counter to control timing of said counter, said clock mounted in proximity to the counter beneath the frame; and

at least one electrical conductor to establish electrical communication between the circuit and a pre-existing power source.

4,875,144

FABRIC WITH ILLUMINATED CHANGING DISPLAY

Harry L. Wainwright, 918 Delaware Ave., Bethlehem, Pa. 18015

Filed Sep. 14, 1987, Ser. No. 96,557
Int. Cl.[4] F21L *15/08*
U.S. Cl. 362—103 **3 Claims**

1. A fabric with an illuminated animated display including a first frame and a second frame and comprising:

(A) a fabric outer surface;

(B) a first plurality of flexible optical fibers each having a first end a second end;

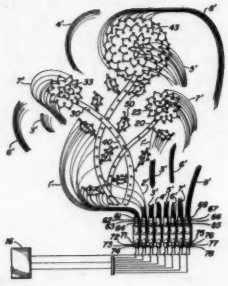
(C) a second plurality of flexible optical fibers each having a first end and a second end;

(D) said first plurality of optical fibers gathered into a first bundle;

(E) said second plurality of optical fibers gathered into a second bundle;

(F) a portion of said second ends of said first bundle of optical fibers secured to said fabric and extending to said fabric outer surface to form at least a portion of said first and second frames of said display;

(G) a portion of said second ends of said second bundle of optical fibers secured to said fabric and extending to said fabric outer surface to form at least a portion of said second frame of said display;



(H) a first light source means adjacent said first ends of said first bundle of optical fibers to emit light to said first ends and through said fibers to sequentially illuminate said second ends forming at least a portion of said first and second frames of said display on said fabric outer surface;

(I) a second light source means adjacent said first ends of said second bundle of optical fibers to emit light to said first ends and through said fibers to sequentially illuminate said second ends forming at least a portion of said second frame of said display on said fabric outer surface to create the appearance of animation of said display.

4,875,145

LIGHT APPARATUS FOR ANIMAL PETS

Robert E. Roberts, 2033 N. Sunset Rd., Apache Junction, Ariz. 85219

Filed Apr. 18, 1988, Ser. No. 182,404
Int. Cl.[4] F21L *15/08*
U.S. Cl. 362—103 **14 Claims**

1. Light apparatus for attaching to pets, comprising, in combination:

a collar fastened about a pet;

housing means, including a light transmissible portion;

means for securing the housing means to the collar in a predetermined orientation and for allowing the housing means to move relative to the pet and relative to the collar while maintaining the predetermined orientation;

light producing means disposed within the housing means for producing light transmissible through at least a portion of the housing means; and

electric circuitry means selectively connected to the light producing means, including

battery means for providing an electric current for the light producing means, and

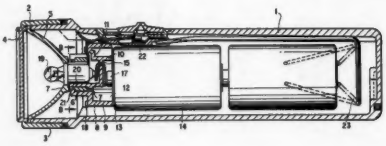
switch means for selectively connecting and disconnecting the battery means and the light producing means.

4,875,146

FLASHLIGHT BULB MOUNTING

John H. Drane, London, United Kingdom, assignor to Duracell Inc., Bethel, Conn.

PCT No. PCT/US86/01732, § 371 Date May 19, 1987, § 102(e) Date May 19, 1987, PCT Pub. No. WO87/01175, PCT Pub. Date Feb. 26, 1987
PCT Filed Aug. 20, 1986, Ser. No. 60,244
Claims priority, application United Kingdom, Aug. 21, 1985, 8520960
Int. Cl.[4] F21L *7/00*
U.S. Cl. 362—202 **2 Claims**



1. A portable lamp comprising a lamp body, a bulb holder in the lamp body, a battery space adjacent the bulb holder for containing at least one battery cell, and means for limiting relative movement of the battery cell towards the bulb holder, characterized in that the bulb holder is a body of plastic material which includes the said movement limiting means as an integral part thereof, with said bulb holder and the integral, movement limiting means comprising inner and outer annular walls, a flange integral with and extending radially between a forward portion of the outer annular wall and the inner annular wall, and radial ribs extending rearwardly of the said flange and being integral with said flange and with the said outer annular wall, and the said movement limiting means extending axially beyond the central contact pip of the bulb, whereby said movement limiting means is adapted to be contacted by the adjacent battery cell upon any axial forward movement thereof to divert shock away from said central contact pip of the bulb.

4,875,147

DELAYED ACTION FLASHLIGHT

Robert T. Auer, East Stroudsburg, Pa., assignor to Buddy L. Corporation, New York, N.Y.

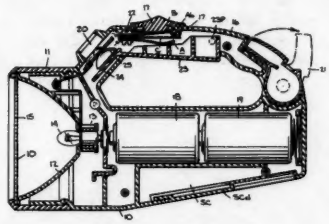
Filed Mar. 20, 1989, Ser. No. 325,947
Int. Cl.[4] F21L *7/00, 11/00*
U.S. Cl. 362—205 **9 Claims**

1. A flashlight provided with a casing housing a battery supply and a light bulb, and having a U-shaped handle graspable by an operator to direct a light beam projected from the bulb, said flashlight incorporating a delayed action switch assembly adapted to connect said supply to said bulb for a predetermined interval, at the conclusion of which the flashlight is automatically turned off, said assembly comprising:

(a) a pivoted trigger lever mounted on the underside of the handle, said lever having a flat leading section;

(b) a suction cup having memory characteristics, and means mounting the cup fixedly within the casing at a position at which it is engaged by the flat leading section when the lever is momentarily depressed, said cup being then compressed and collapsed by the flat leading section to retain

the lever in a depressed state for a predetermined interval determined by the memory characteristics of the cup, at the conclusion of which the cup resumes its normal form and the lever is released; and



(c) switch means cooperating with said lever operative to connect said supply to said bulb only when said lever is in the depressed state.

4,875,148

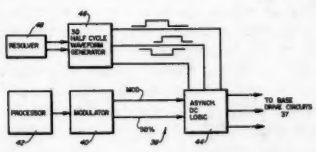
CONTROL FOR PRODUCING A LOW MAGNITUDE VOLTAGE AT THE OUTPUT OF A PWM INVERTER

Derrick I. Roe, Rockford, Ill.; Christopher J. Rozman, Delavan, Wis., and Bradley J. Recker, Rockford, Ill., assignors to Sundstrand Corporation, Rockville, Ill.

Filed Dec. 16, 1988, Ser. No. 285,117

Int. Cl.[4] H02M *1/44*

U.S. Cl. 363—41 **9 Claims**



1. A method of operating an inverter to produce an output voltage having two levels wherein the inverter includes first and second switches coupled to an inverter output, the switches being operable in a first switch state during which both switches are on or both switches are off and in a second switch state during which one switch is on and the other is off and wherein each switch has a minimum on time limit, comprising the steps of:

producing first and second switch control signals each having alternating switch on and switch off portions wherein each switch on portion is of a duration in excess of the minimum on time limit of a switch; and

operating the first and second switches in accordance with the first and second switch control signals, respectively, to produce the output voltage wherein the switches are operated in one of the switch states for a duration less than the minimum on time limit of a switch to cause the output voltage to assume one of the levels during such time.

4,875,149

PHASE SEPARATION CONTROL

Christopher J. Rozman, Delavan, Wis.; Derrick I. Roe, and Bradley J. Recker, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockville, Ill.

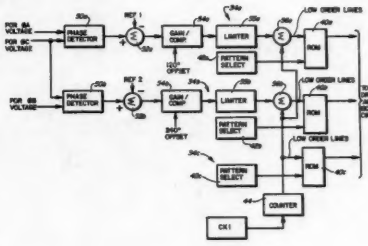
Filed Dec. 16, 1988, Ser. No. 285,118

Int. Cl.[4] H02M *1/12*

U.S. Cl. 363—41 **11 Claims**

1. A waveform generator which develops a certain number of phase outputs at desired angular displacements relative to a reference phase output wherein each phase output is produced by at least one switch controlled by a control waveform, comprising:

means for determining the angular deviation of each of the certain number of phase outputs from the desired angular displacement for such phase output; and



means responsive to the determining means for adjusting the control waveform for each switch in time based upon the angular deviation of the phase output produced by such switch so that the angular deviations are minimized.

4,875,150

PARALLEL OSCILLATORY CIRCUIT FREQUENCY CONVERTER WITH SAFETY CIRCUIT

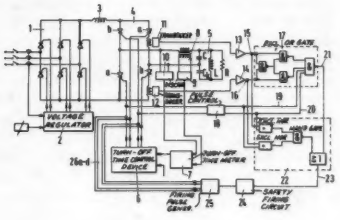
Hans G. Matthes, Wermelskirchen, Fed. Rep. of Germany, assignor to AEG-Elotherm GmbH, Remscheid-Hasten, Fed. Rep. of Germany

Filed Aug. 3, 1988, Ser. No. 227,895

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1987, 3729786

Int. Cl.[4] H02M *7/515;* H02H *7/00*

U.S. Cl. 363—51 **4 Claims**



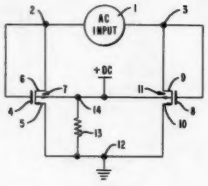
1. A parallel oscillatory circuit frequency converter comprising: a rectifier; an inverse rectifier having two pairs of thyristors arranged in a bridge circuit; a parallel oscillatory circuit including an inductance and a series connection of two capacitors of which one capacitor is connected to load points of the bridge circuit; a turn-off time control device for the alternate firing of the pairs of thyristors in diagonally adjacent branches of the bridge circuit with a cycle frequency adapted to maintain a minimum turn-off time; a detector circuit coupled to the pairs of thyristors to detect incorrect firing thereof; and a safety firing circuit controlled by the detector circuit to deliver firing pulses without delay to all the thyristors at least until all the thyristors are current-carrying.

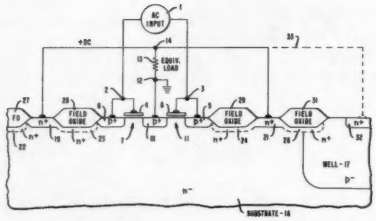
4,875,151

TWO TRANSISTOR FULL WAVE RECTIFIER

Daniel L. Ellsworth, and Maurice M. Moll, both of Fort Collins, Colo., assignors to NCR Corporation, Dayton, Ohio

Filed Aug. 11, 1986, Ser. No. 895,408
Int. Cl.[4] H02M 7/217
U.S. Cl. 363—127 **12 Claims**





1. A two transistor full wave rectifier, comprising:

first and second field effect transistors of first conductivity type, each resident in a substrate region of second conductivity type and each having respective first and second electrode regions and a gate electrode;

a first node, defining a common connection of a DC load terminal, the first electrode region of the first field effect transistor and the first electrode region of the second field effect transistor;

a second node, defining a common connection of the second electrode region of the first field effect transistor, the gate electrode of the first field effect transistor and the first of two connections to a source of AC voltage;

a third node, defining a common connection of the second electrode region of the second field effect transistor, the gate electrode of the second field effect transistor and the second of the two connections to the source of AC voltage; and

a fourth node, defining a common connection of the other DC load terminal and the second conductivity type substrate region of each resident field effect transistor.

4,875,152

ELECTRICAL TAP SWITCH

William H. Foster, Box 694, Kinistino, SASK S0J J-1H0, Canada

Filed Mar. 16, 1988, Ser. No. 169,013
Int. Cl.[4] H02M 1/00
U.S. Cl. 363—146 **4 Claims**

1. An electrical tap switch, comprising:

(a) a generally rectilinear shell;

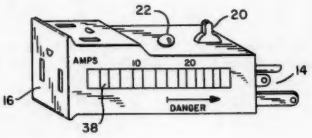
(b) a power plug mounted directly on said shell;

(c) a first power outlet;

(d) a second power outlet connected in parallel to said first power outlet;

(e) a double pole double throw switch with switch actuator projecting upward from a top surface of said shell, wherein said switch is in series between said plug and said outlets; and,

f) an indicator connected in parallel with both said outlets whereby closing said double pole switch energizes both said power outlets, wherein said indicator turns on when said power outlets are energized, wherein said plug projects outward from one end of said shell, said first outlet is integral to the end of said shell, and said second outlet is integral to the top of said shell and is located in close proximity to said first outlet, thereby allowing for in-line use of said electrical tap switch, wherein said indicator comprises a current transformer consisting of a conductor wrapped around a common switched current carrying conductor, a diode to rectify the current from ac to dc; an amplifier to increase the amplitude of the rectified voltage, a driver, and a bar graph display, mounted to the front of said shell and driven by said driver, such that said bar graph displays the total current delivered to said outlets.

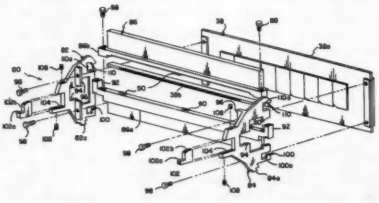


4,875,153

MECHANISM FOR ACCURATELY MOUNTING AN ELECTRONIC LIGHT EMITTING PRINTHEAD ASSEMBLY

Douglas A. Hons, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 5, 1988, Ser. No. 279,737
Int. Cl.[4] G01J 15/00
U.S. Cl. 346—155 **14 Claims**



1. In a reproduction apparatus including an image receiving member, at least one support for said image receiving member, and an electronic light emitting print head assembly including light emitting elements and a focusing lens, a mechanism for accurately mounting said electronic print head assembly rela-

tive to said image receiving member, said mechanism comprising:

a frame; means for mounting said print head assembly at a preselected location in said frame; a first feature defined in said frame, said first feature including a locating surface spaced at a preselected distance from the plane through the geometric center line of said focusing lens of said print head assembly; a second feature defined by said frame, said second feature including a pair of interconnected locating surfaces, the first of said pair of locating surfaces spaced at a preselected distance from the plane through the geometric center line of said focusing lens, and the second of said pair of locating surfaces spaced at a preselected distance from the image plane of said focusing lens;

a locating member supported in said reproduction apparatus; and

means for urging said frame in a direction such that said locating surface of said first feature engages said locating member and said second feature engages the support for said image receiving member.

4,875,154

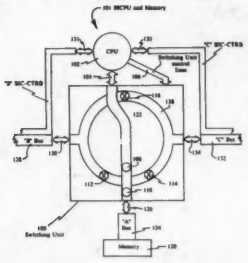
MICROCOMPUTER WITH DISCONNECTED, OPEN, INDEPENDENT, BIMEMORY ARCHITECTURE, ALLOWING LARGE INTERACTING, INTERCONNECTED MULTI-MICROCOMPUTER PARALLEL SYSTEMS ACCOMODATING MULTIPLE LEVELS OF PROGRAMMER DEFINED HEIRARCHY

Maurice E. Mitchell, 601 Terra California, #4, Walnut Creek, Calif. 94595

Continuation-in-part of Ser. No. 541,453, Oct. 13, 1983, abandoned. This application Jun. 12, 1987, Ser. No. 61,338

Int. Cl.[4] G06F *13/00*

U.S. Cl. 364—206 28 Claims



1. A microcomputer data processing apparatus, comprising:

a Central Processing Unit (CPU),

a path configuring means,

path control circuits connecting said CPU to said path configuring means,

a plurality of contacts comprised of a plurality of distinct sets,

wherein said CPU further comprises a dedicated memory address circuit, a dedicated memory data circuit, a dedicated memory control circuit and a dedicated power circuit,

wherein said path configuring means further comprises a dedicated memory address circuit, a dedicated memory data circuit and a dedicated memory control circuit,

wherein each said dedicated memory address, data, and control circuit includes a plurality of dedicated memory address, data, and control lines respectively, wherein

said memory control lines are comprised of a read/write line, timing lines and status lines,

first switch means comprised of at least three distinct parts for connecting said dedicated memory address, data, and control circuits of said path configuring means to each of said first three sets of contacts, and

second switch means for connecting said dedicated memory address, data, and control lines of said path configuring means to said dedicated memory address, data, and control lines of said CPU respectively.

wherein said first and second switch means assume a non signal-conducting state when said CPU power circuit is not supplied with power,

wherein said lines of said CPU and said contacts assume a non-signal conducting state when said first and second switch means are in said non-signal conducting state,

means for causing said first and second switch means to remain in said non signal-conducting state upon application of power to said CPU power circuit and to assume a signal-conductive state upon receipt of an appropriate signal from said CPU, and to

assume a non signal-conducting state upon receipt of an appropriate signal from said CPU.

4,875,155

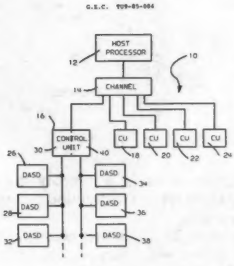
PERIPHERAL SUBSYSTEM HAVING READ/WRITE CACHE WITH RECORD ACCESS

James L. Iskiyan; Vernon J. Legvold; Peter L. H. Leung, and Guy E. Martin, all of Tucson, Ariz., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 28, 1985, Ser. No. 749,897

Int. Cl.[4] G06F *12/08*

U.S. Cl. 364—200 15 Claims



1. In a data storage hierarchy having a front store and a back store each of which have a multiplicity of addressable data storage locations with diverse ones of the addressable data storage locations being further divided into addressable record locations of diverse sizes; programmable processor means connected to said front and back stores and data transfer means connected to said programmable processor means and to said front and back stores for effecting data transfers between the stores in response to commands received from the programmable processor means; attachments means connected to said programmable processor means and to said data transfer means for effecting data transfers between the attachment means and said data transfer means in response to commands received from the programmable processor means; control storage means operatively connected to the programmable processor means for supplying programming indicia signals to the programmable processor means and for storing control signals supplied by the programmable processor means and for supplying such stored processor control signals to said programmable processor means;

the improvement, including the combination of:

means for indicating for each record of each track of each device in said back store;

means responsive to said indicating means for transferring said first or said second version of said record in accordance with predetermined criteria;

indicating further comprising: a first table having at least one bit for each device in said back store; a second table having at least one bit for each track of each said device; and a third table having a plurality of entries, each entry having indicia of location of a record in said cache;

means for controlling asynchronous destaging of records, in response to information stored in said first and second tables; and

said asynchronous control means comprising a fourth table for storing information for each record to be asynchronously destaged to the back store whether a first version of record data stored in said front store is modified with respect to a second version of said record stored in back store.

4,875,156

COMPUTER HAVING A PROTECTION DEVICE TO SELECTIVELY BLOCK INCORRECT CONTROL SIGNALS

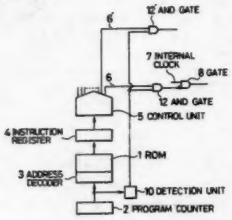
Kouji Tanagawa, and Tomoaki Yoshida, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Mar. 3, 1987, Ser. No. 22,062

Claims priority, application Japan, Mar. 5, 1986, 61-46381

Int. Cl.[4] G06F *11/00*

U.S. Cl. 364—200 **8 Claims**



1. A computer for executing a program stored therein, the program having a first type of instruction and a second type of instruction, comprising:

a program memory having a first area for storing the first type of instruction and a second area for storing the second type of instruction,

a program counter providing an address code,

said program memory being responsive to said address code for producing an instruction code stored at a memory location designated by said address code,

a control unit responsive to said instruction code from said program memory for producing a control signal corresponding to the first type of instruction for controlling computer operation, and

protection means for suppressing the control signal produced by said control unit corresponding to the first type of instruction when said address code provided by said program counter does not designate a memory location in said first area.

4,875,157

ALTERNATE MEMORY ADDRESSING FOR INFORMATION STORAGE AND RETRIEVAL

James J. Frimmel, Jr., San Diego, Calif.; Thomas Ouellette, Fairfax, and Richard N. Deglin, Reston, both of Va., assignors to International Telesystems Corporation, Herndon, Va.

Filed Mar. 18, 1987, Ser. No. 27,240

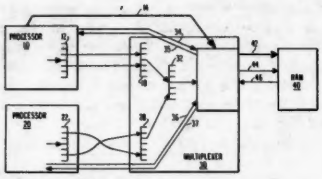
Int. Cl.[4] G06F *12/00*

U.S. Cl. 364—200 **8 Claims**

1. An apparatus for the alternate addressing of a common memory system for storing and retrieval of digitized information comprising:

first processor means connected to said memory system for writing said digitized information to said memory system, said digitized information written to said memory system being organized as a plurality of channels on a row-by-row basis in said memory system;

second processor means connected to said memory system for reading from said memory system said digitized information in defined segments as a plurality of frames from each of said plurality of channels on a column-by-column basis in said memory system; and



switching means for selectively connecting said first and second processor means to different address spaces of said memory system, said first and second processor means having simultaneous access to said memory system.

4,875,158

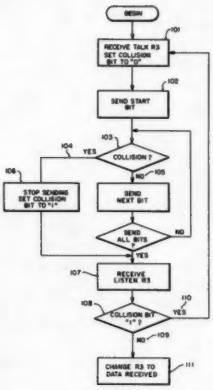
METHOD FOR REQUESTING SERVICE BY A DEVICE WHICH GENERATES A SERVICE REQUEST SIGNAL SUCCESSIVELY UNTIL IT IS SERVICED

Peter B. Ashkin, Los Gatos, and Michael Clark, Glendale, both of Calif., assignors to Apple Computer, Inc., Cupertino, Calif.

Division of Ser. No. 765,396, Aug. 14, 1985. This application Dec. 14, 1987, Ser. No. 132,121

Int. Cl.[4] G06F *13/14, 13/38*

U.S. Cl. 364—200 **4 Claims**



1. A method for requesting service by a device coupled to a host computer through a communication medium, comprising the steps of:

(1) the host computer setting a service request bit of the device to a first logical value to allow the device to produce a service request signal if the device requires servicing;

(2) the device determining that it requires servicing and setting an internal flag bit to a first logical value to indicate that the device requires servicing;

(3) the device monitoring a command from the host computer to see if the command is addressed to the device;

(4) if the command is not addressed to the device and if the service request bit is set to the first logical value, then the device generating a service request signal on the medium after the command by holding the communication medium low for a first period of time;

(5) if the command is addressed to the device, if the device determines that the command is not a command that services the device, and if the service request bit is set to the first logical value, then the device:

(a) generating the service request signal on the medium after the command by holding the medium low for the first period of time and

(b) performing the command;

(6) if the command is addressed to the device, if the device determines that the command is not a command that services the device, and if the service request bit is not set to the first logical value, then the device performing the command without generating the service request signal;

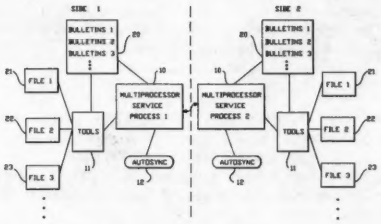
(7) repeating steps 3, 4, 5, and 6 until the device receives a command addressed to the device that services the device.

4,875,159

VERSION MANAGEMENT SYSTEM USING PLURAL CONTROL FIELDS FOR SYNCHRONIZING TWO VERSIONS OF FILES IN A MULTIPROCESSOR SYSTEM

Richard W. Cary, Los Gatos, and Richard D. Guyon, Mountain View, both of Calif., assignors to Amdahl Corporation, Sunnyvale, Calif.

Filed Dec. 22, 1987, Ser. No. 136,859
Int. Cl.[4] G06F *13/42, 9/46, 15/16, 15/40*
U.S. Cl. 364—200 **25 Claims**



18. In a data processing system storing a first version of a pre-specified plurality of data sets and storing a second version of the pre-sepcified plurality of data sets, an apparatus for synchronizing the first and second versions of the pre-specified plurality of data sets, comprising:

processing means, associated with each of the first and second versions for reading and writing the versions of the pre-specified data sets, including

means for storing an index node identifying the version with a sync-complete control field and a sync-in-progress control field, the sync-complete control field indicating when set that the identified version is synchronized and the sync-in-progress control field indicating when set that the identified version is in the process of being synchronized;

means for clearing the sync-complete control field and the sync-in-progress control field in a given index node in response to a write to the version identified by the given index node; and

synchronizing means, in communication with the processing means, for synchronizing the first and second versions, including

first means for detecting the sync-complete control field for the first and second versions, and if either or both are cleared, then setting the sync-in-progress control field in the index node identifying a selected version of the first and second versions;

means for transferring a copy of the selected version to a temporary file to establish a temporary version;

second means for detecting the sync-in-progress control field for the selected version, and if it is set when the temporary version is complete, then setting the sync-complete control field and clearing the sync-in-progress control field in the index node identifying the selected version;

means for setting the sync-complete control field in the temporary version; and

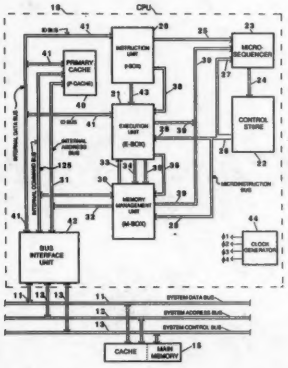
means for updating the index node for the temporary version to rename the temporary version to the name of the one of the first and second versions not selected by the first means for detecting and removing the version not selected.

4,875,160

METHOD FOR IMPLEMENTING SYNCHRONOUS PIPELINE EXCEPTION RECOVERY

John F. Brown, III, Northborough, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Jul. 20, 1988, Ser. No. 221,934
Int. Cl.[4] G06F *9/38*
U.S. Cl. 364—200 **27 Claims**



1. A processor comprising:

(a) an execution unit having a plurality of execution stages for accessing operands from local registers, performing operations on said operands, and for storing results of said operations;

(b) a memory interface unit having a plurality of stages including a memory-request stage for receiving memory address from said execution unit and a memory-access stage for evaluating said memory address to determine if said memory address is available for access and for accessing a memory if said address is available or for issuing an exception control signal if said memory address is not available for access;

(c) pipelining means for applying sets of control bits to each of said stages of said execution unit and to each of said memory-request stage and said memory-access stage of said memory interface unit in successive ones of machine cycles of the processor.

(d) latch means for holding a set of said control bits applied to said memory-access stage of said memory interface unit when said exception control signal is issued in a given one of said machine cycles, and for thereafter re-applying said set of control bits to said memory-access stage in a subsequent one of said machine cycles after said given machine cycle.

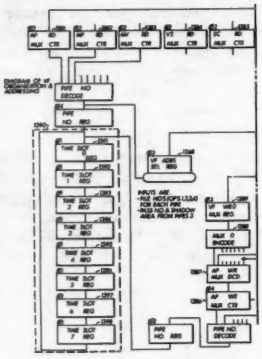
4,875,161
SCIENTIFIC PROCESSOR VECTOR FILE ORGANIZATION

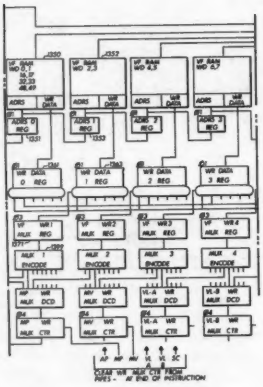
Archie E. Lahti, Fridley, Minn., assignor to Unisys Corporation, Blue Bell, Pa.

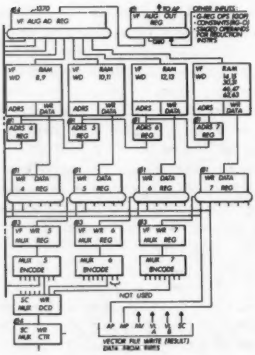
Continuation of Ser. No. 761,137, Jul. 31, 1985, abandoned. This application Nov. 14, 1988, Ser. No. 273,173

Int. Cl.[4] G06F *15/347, 12/06*

U.S. Cl. 364—200 **11 Claims**







1. In a scientific vector processor having multiple independent instruction execution pipelines, a vector file memory system comprising:

a first vector file means for addressably storing a plurality of vector files made up of vector elements in a predetermined storage configuration;

a second equal vector file means for addressably storing a second plurality of vector files made up of vector elements in said predetermined storage configuration;

each of said first and second vector file means including an identical plurality of N memory blocks, wherein each of said memory blocks comprises a random access memory means having storage locations for storing vector elements, addressing means for providing address signals for addressing said storage locations, and a separate writing means for writing vector elements in addressed ones of said storage locations;

each of said random access memory means including a plurality of successive addressable storage locations wherein each such successive location stores contiguous information successively separated by N locations, where N equals the number of said N memory blocks;

N address registers, each coupled to said addressing means of a respectively associated one of said N memory blocks wherein N−1 of said N address registers are successively interconnected one to another such that the output of each of said address registers is connected to the input of a successive one of said address register; and

a time slot management mechanism coupled to each of said first and said second vector file means to allocated and maintain memory access by the multiple independent instruction execution pipelines in a predetermined sequence of said N memory blocks.

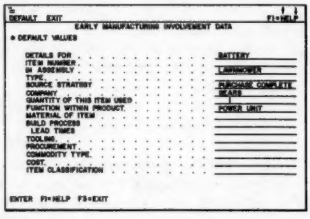
4,875,162
AUTOMATED INTERFACING OF DESIGN/ENGINEERING SOFTWARE WITH PROJECT MANAGEMENT SOFTWARE

Kate M. Ferriter, Atlanta, and Robert B. Mathis, Marietta, both of Ga., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 28, 1987, Ser. No. 115,073

Int. Cl.[4] G06F *15/21*

U.S. Cl. 364—401 **4 Claims**



1. A method for the automatic interfacing of a conceptual design tool with a project management tool, said conceptual design tool providing for the early manufacturing involvement information needed to aid and improve the total design and manufacturing effort to produce a final product, said method comprising the steps of:

using said conceptual design tool, prompting a user to input a functional product structure;

capturing product structure data input by the user in a database;

using said conceptual design tool, prompting a user to input manufacturing details for each item in the functional product structure;

capturing manufacturing detail data input by the user in said database;

prompting a user for rules which determine which items of the product structure are critical;

selecting items from database which fulfill criticality requirements;

ordering selected critical items according to lead times from manufacturing detail data gathered by said conceptual design tool and captured in said database;

formatting the ordered selected items in a file of said project management tool; and

importing the formatted file into said project management tool.

4,875,163

ELECTRONIC CASH REGISTER SYSTEM WITH FASTER ACCESS TIME TO PRICE LOOK-UP FILE

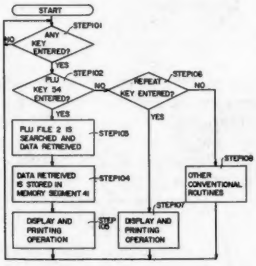
Hiroaki Ishii, Ohtsu, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Sep. 14, 1987, Ser. No. 95,625

Claims priority, application Japan, Sep. 22, 1986, 61-224355; Sep. 24, 1986, 61-227000

Int. Cl.[4] G06F *15/00*

U.S. Cl. 364—405 **14 Claims**



1. An electronic cash register system, comprising:

a PLU file storing item data corresponding to different classes of articles to be processed by said electronic cash register system, said item data comprising at least a PLU code and an item price data, wherein each particular article to be processed is within one of said classes of articles and all particular articles within a same class have the same item data;

storage means for receiving and temporarily storing item data from said PLU file, corresponding to different classes of articles processed by said electronic cash register system;

access means for accessing said item data stored in said storage means when a present particular article being processed by said ECR system is within a same class of articles as a preceding article processed by said electronic cash register system and having its item data stored in said storage means; and

output means, responsive to said item data accessed by said access means, for providing an output representation of at least said item price data.

4,875,164

PROCESSING SYSTEM FOR A GAMBLING GAME

Jean-Jacques Monfort, 3 allée des Rives de Bagatelle, Suresnes 92150, France

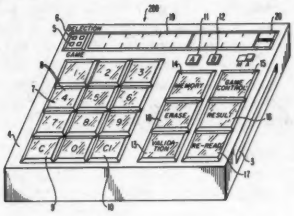
PCT No. PCT/FR85/00301, § 371 Date Jun. 24, 1986, § 102(e) Date Jun. 24, 1986, PCT Pub. No. WO86/02752, PCT Pub. Date May 9, 1986

PCT Filed Oct. 23, 1985, Ser. No. 885,608

Claims priority, application France, Oct. 25, 1984, 84 16340

Int. Cl.[4] G06F *15/28*

U.S. Cl. 364—412 **20 Claims**



1. A system for processing a gambling game having determined paying and stake rules, said game consisting of receiving and recording bets of gamblers, collecting sums paid by the gamblers with respect to a stake, carrying out a drawing in accordance with the rules of the game and distributing winnings to those gamblers whose bets correspond to the drawing, said system comprising:

an information support comprising a memory zone capable of being erased and written into;

a first means, said first means being independent and portable and comprising a first reading means, an erasing means, and a first writing means for respectively reading, erasing and writing bet data in said information support, and a checking means for checking of the result after the drawing;

a second means associated with a computer of a bets managing center, said second means comprising a second reading means for reading bet data written in said information support by said first means, and a sending means for sending to said computer of said bets managing center bet data to be recorded, and an indicating and recording means for indicating and collecting sums to be collected with respect to the stake, and a second writing means for writing in said information support in a zone inaccessible to said first means indications relating to the bet data.

4,875,165

METHOD FOR DETERMINATION OF 3-D STRUCTURE IN BIPLANE ANGIOGRAPHY

Laura E. Fencil, Chicago; Charles E. Metz, and Kunio Doi, both of Willowbrook, all of Ill., assignors to University of Chicago, Chicago, Ill.

Filed Nov. 27, 1987, Ser. No. 126,266

Int. Cl.[4] G01B *11/24*; G06F *15/42*

U.S. Cl. 364—413.22 **13 Claims**

1. A method for determination of 3-D structure of an object in biplane angiography, comprising:

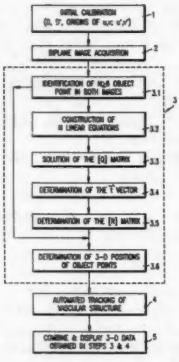
providing first and second imaging systems including first and second x-ray sources each having a focal spot and respective first and second x-ray sensitive receivers each defining an image plane, said first x-ray source arranged to transmit x-rays from its focal spot in a first direction through said object to the image plane of said first receiver and said second x-ray source arranged to transmit x-rays from its focal spot in a second direction arbitrarily selected with respect to said first direction through said object to the image plane of said second receiver;

determining the distances (D, D') of perpendicular lines from the focal spot of each x-ray source to the image plane of the respective receiver;

determining the points on respective image planes where respective perpendicular lines from the respective focal spots to the respective image planes intersect the respective image planes and defining said points on respective image planes as the origins of respective two dimensional image coordinate systems (uv), (u'v') at the respective image planes, wherein said focal spots and the respective image planes define respective first and second three-dimensional coordinate systems having respective z axes coincident with said perpendicular lines (D, D') in the directions of respective image planes, x axes parallel to respective of the image plane axes (u, u') and y axes parallel to respective of the image plane axes (v,v'), where the relative geometry of said first three dimensional coordinate system with respect to said second three dimensional coordinate system is defined by

$$x_1' = [R]\{x_1 - t\},$$

where x_1', is the position vector of the object point (x_i', y_i', z_i') in said second three dimensional coordinate system, x_1 is the position vector of the same object point (x_i, y_i, z_i) in said first three dimensional coordinate system, [R] is a rotation matrix defining the rotation in three-dimensional space between the



first and second three-dimensional coordinate systems and t expresses, in the first coordinate system xyz, a unit translation vector that moves the origin of the first coordinate system xyz to the origin of the second coordinate system;

irradiating said object with x-rays from said x-ray sources and producing respective first and second images defined by digital image data based on the x-rays received by said first and second receivers;

determining from each of said first and second images the image coordinates ((u, v), (u', v')) in the respective coordinate systems of N objects points, where $N \geqq 8$, which correspond to the same object points in the object;

scaling the image coordinates (u_i, v_i), (u_i', v_i') of said eight points by respectively dividing said image coordinates by the respective distances (D, D') to obtain normalized image coordinates (ξ_i, η_i), (ξ_i', η_i');

constructing N linear equations, one for each object point, containing only normalized image coordinates (ξ_i, η_i), (ξ_i', η_i') and nine unknown elements (q_{kl}), where q_{kl} represent an unknown relative geometry between the two imaging systems in terms of nonlinear combinations of the elements of the translation vector (t) and the rotation matrix [R];

solving the N linear equations for eight of the q_{kl} values relative to the ninth q_{kl} value to produce a matrix $[Q^*]$; and

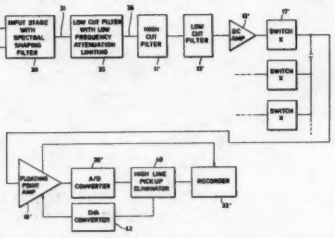
determining scaled three dimensional coordinate (x_i, y_i, z_i) of said N object points expressed in units of a unit translation vector t from the product matrix $[Q^*][A^*]$.

4,875,166

BANDWIDTH ENHANCING SEISMIC ACQUISITION SYSTEM AND METHOD

Paul E. Carroll; Roy W. James, III, both of Houston; Charles K. Bowen, Richmond, and Gillan C. Smith, Houston, all of Tex., assignors to Input/Output, Inc., Stafford, Tex.

Filed Oct. 9, 1987, Ser. No. 107,500
Int. Cl.[4] G06C 7/48
U.S. Cl. 364—421 **20 Claims**



13. In combination with a geophysical data acquisition system channel, including an input stage responsive to seismic signals and a recorder for storing representations of said signals, an attenuated limited low-cut filter disposed between said input stage and said recorder, said attenuated limited low-cut filter comprising,

first means for producing a cut-off frequency f_c such that signals of frequency below f_c are increasingly attenuated with decreases in frequency below said cut-off frequency f_c, and

second means for limiting attenuation of such signals at low frequencies approaching zero frequency,

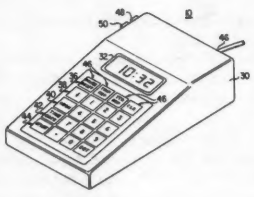
whereby said attenuation limited low-cut filter has an input-output response characterized by a cut-off frequency f_c and limited attenuation at low frequencies approaching zero frequency.

4,875,167

ODOMETER DATA COMPUTING APPARATUS

John W. Price, Garland, and John F. Brady, III, Dallas, both of Tex., assignors to Mileage Validator, Inc., Richardson, Tex.

Continuation of Ser. No. 861,436, May 9, 1986, abandoned. This application Jun. 28, 1988, Ser. No. 214,919
Int. Cl.[4] G06F 15/74
U.S. Cl. 364—424.04 **2 Claims**



1. An odometer monitoring system for a vehicle comprising:

(a) a power supply means for producing a stable voltage from a vehicle power supply responsive to ignition switch turn on of the vehicle;

(b) a sensor means including a sensor for sensing the rotations of a drive shaft and a means for generating signals representative of the drive shaft rotations;

(c) a clock means for generating clock pulses and time and data information;

(d) input means including digit keys, odometer key, time/-data key, start key, pause key, end of trip key, trip report key, and year to data key;

a calibration switch means for selecting either a distance calibration operation mode or a distance measurement mode of operation;

(f) a display means for displaying operation information; and

(g) an odometer computer means connected to the power supply means for receiving electrical operating power, said odometer computing means including counting means and first and second storage means, the counting means being connected to the sensor means for counting the number of signals output by the sensor means, means connected to the calibration switch means for activating the counting means for selectively determining the number of drive shaft rotations per measurement unit for calibration or for accumulating the number of drive shaft revolutions during a trip, means connected to the counting means for determining the distance being traveled using the number of drive shaft revolutions per measurement unit and the number of rotations counted during a trip for storage in the first storage means; means connected to the odometer key and digit keys for entering an odometer reading into the first storage means; means connected to the clock means and display means and responsive to the time and date key and digit keys for setting the clock, means connected to the start key for loading into the first storage means trip information for the beginning of a business trip including the current time and date and odometer reading and incrementing a trip number, means connected to the end of trip key for loading trip ending trip report information including time and date, trip distance, and odometer reading into the first storage means, means connected to the pause key for interrupting a business trip in progress for storing trip report information for a nonbusiness use and at the end thereof responsive to the pause key for resuming tallying the distance of the business trip for a business trip report, means connected to the clock and date means for determining whether the year has ended, means connected to the start key and clock means for determining whether a trip is in progress at the end of the year, means connected to the end of trip key for ending any trip in progress, means connected to the first storage means for accumulating total distance and business trip distance for a year and a year to date report, means interconnecting the first and second storage means for transferring the year or year to date report date to the second storage means and clearing the first storage means for receiving the next year to date information; and means connected to the year to date key and a period key for outputting year to date report information selectively from either the first storage means or from the second storage means to an output port, and a trip report means connected to the trip report key for outputting the trip report information to the output port.

4,875,168

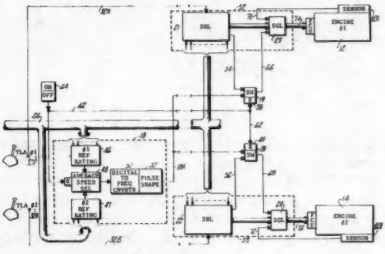
ENGINE SPEED CONTROL APPARATUS

Anthony N. Martin, Simsbury, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 22, 1987, Ser. No. 136,797
Int. Cl.[4] F02C 9/42
U.S. Cl. 364—431.01 **2 Claims**

1. Apparatus, for synchronizing the speed of engines on an aircraft, the engines being of the type having an electronic engine control (EEC) unit and a fuel control unit (FCU), the EEC unit having speed rating logic (SRL) circuitry and speed governing loop (SGL) circuitry, the SRL circuitry including a signal processor with signal memory for storing signals representing an engine speed algorithm, the processor using the algorithm to calculate the magnitude of an EEC command speed signal (N sel) in response to sensed operating data received from the aircraft, the SGL circuitry receiving the EEC command speed signal at an input thereof for providing a command fuel flow signal (Wf) to the FCU at a magnitude dependent on the magnitude of the EEC command speed signal, the FCU controlling fuel to the engine in dependence on the magnitude of the command fuel flow signal, the apparatus comprising:

synchronizer reference unit (SRU) means, responsive to the sensed operating data from the aircraft, and having SRL circuitry for calculating a SRU command speed signal at a magnitude substantially equal to that of the EEC command speed signal; and



electronic switch means, one associated with each EEC unit, each switch means receiving the EEC command speed signal from the SRL circuitry of the associated EEC unit at a first input thereof, and each switch connected at an output thereof to the input of the SGL circuitry of the associated EEC unit, each switch further receiving the SRU command speed signal from the SRU means at a second input thereof, each said switch means being responsive to operator control for selectably connecting one of said inputs to said output, whereby the SGL circuitry provides the command fuel flow at a magnitude dependent, alternately, on the magnitude of the EEC command speed signal and on the magnitude of the SRU command speed signal.

4,875,169

METHOD FOR IMPROVING THE LIMIT OF DETECTION IN A DATA SIGNAL

Robert E. Synovec, and Edward S. Yueng, both of Ames, Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Continuation of Ser. No. 851,129, Apr. 11, 1986, abandoned.
This application May 27, 1988, Ser. No. 201,304
Int. Cl.[4] G06F 15/20; G01N 31/08
U.S. Cl. 364—497 **11 Claims**

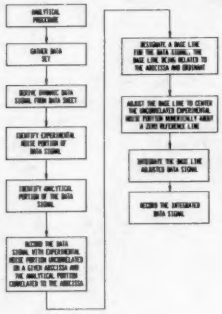
1. A method for improving limit of detection for a data set represented in a dynamic data signal derived from an analytical procedure in which an experimental noise portion of the data signal is uncorrelated to a given abscissa and an analytical portion of the data signal is correlated to said abscissas, comprising:

collecting, in recorded form on a record means, said data signal by monitoring with detector means at least one analytical procedure, involving analytical equipment and material to be analyzed, to gather said data set, and converting said data set into said data signal which includes said analytical portion and said experimental noise portion;

with the data signal in collected and recorded form, desig-

nating a base line for said data signal after observation of the data signal;

adjusting said base line of said data signal to center said experimental noise portion numerically about a zero reference line while preserving correlation to the abscissa; and



integrating said data signal, after base line adjustment, and preserving corresponding correlated abscissa information for each point of said data signal, said integration producing an enhanced integrated data signal, in recorded form on a record means, with respect to the adjusted base line while causing said experimental noise portion to be minimized, improving said limit of detection.

4,875,170

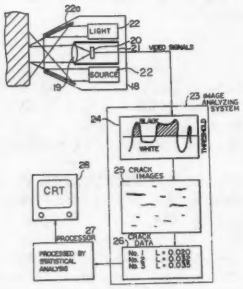
METHOD AND APPARATUS FOR ESTIMATING LIFE EXPECTANCY OF MECHANICAL STRUCTURES

Shigeo Sakurai, Hitachi; Sadao Umezawa, Mito; Saburo Usami, Hitachi; Hiroshi Miyata, Mito; Hajime Toriya, Hitachi; Kuniyoshi Tsubouchi, Mito, and Ryoichi Kaneko, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 850,105, Apr. 10, 1986, abandoned. This application May 31, 1988, Ser. No. 206,924

Int. Cl.[4] G06F *15/20;* **G01M** *7/00;* **G01N** *21/16*

U.S. Cl. 364—507 **13 Claims**



5. An apparatus for estimating a life expectancy of a mechanical structure to which a number of repeated loads is applied, said apparatus comprising:

determining and estimating means for experimentally determining a relationship between a maximum crack length of micro cracks formed in the surface of the structure and a life ratio of the structure, wherein a life ratio represents the number of repeated loads applied to the structure to the number of loads needed to be applied to the structure in order for rupture to occur, and for estimating a life expectancy value of the structure by calculating a current life ratio from the maximum crack length of the micro cracks based on said relationship;

detecting means for detecting a maximum crack length and providing a signal indicating said maximum crack length to said determining and estimating means; and

displaying means for receiving and displaying the estimated life expectancy value of the structure.

4,875,171

WHEEL SPEED CONTROL SYSTEM INCORPORATING IN-GEAR VIBRATION DETECTION AND ELIMINATION MEANS

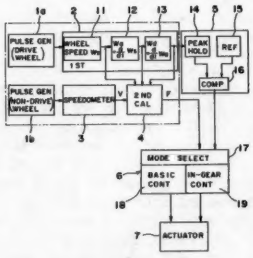
Hideaki Fujioka, and Koji Takata, both of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Sep. 25, 1987, Ser. No. 100,865

Claims priority, application Japan, Sep. 26, 1986, 61-228700

Int. Cl.[4] G01H *11/00;* **G01M** *13/02*

U.S. Cl. 364—508 **20 Claims**



8. An in-gear vibration elimination system provided in a vehicle comprising:

means for detecting a speed of a drive wheel;

means for detecting a speed of a non-drive wheel;

means for obtaining a speed of a vehicle;

means for detecting a deviation of the drive wheel speed from the vehicle speed;

wheel speed control means for controlling the speed of the drive wheel to maintain the deviation within a predetermined limit;

means for taking a differential of said drive wheel speed;

means for producing a reference level;

means for comparing said differential with said reference level and for producing an in-gear signal indicative of the in-gear vibration when said differential exceeds said reference level; and

interrupting means for interrupting the operation of said wheel speed control means in response to said in-gear signal, thereby eliminating the in-gear vibration caused by said wheel speed control means.

4,875,172

LOCOMOTION-COMMAND METHOD FOR MOBILE ROBOTS

Yutaka Kanayama, Nijhari, Japan, assignor to Yutaka Kanayama, Ibaragi and Glory Kogyo Kabushiki Kaisha, Hyogo, both of, Japan

Continuation of Ser. No. 91,362, Aug. 28, 1987, abandoned, which is a continuation of Ser. No. 715,002, Mar. 22, 1985, abandoned. This application Aug. 19, 1988, Ser. No. 235,710

Claims priority, application Japan, Sep. 28, 1984, 59-203326

Int. Cl.[4] G06F *15/50*

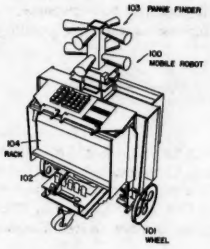
U.S. Cl. 364—513 **5 Claims**

1. A control method for the travel motion of a mobile robot across an area definable by Cartesian coordinates along a traveling route using a main control module sending out coordinate

related control commands as well as a locomotion module moving together with the robot and responding to the control commands and self-controlling the local direction of movement of the robot, characterized by the steps of:

self-controlling of robot by the locomotion module such that said robot follows a given straight line;

sending a change of course from the main control module to the locomotion module, said change of course command



comprising data indicative of a location at which a change of course is to occur and data indicative of an angle between the given straight line and a new direction of travel;

executing the change of course command by the locomotion module when the mobile robot reaches the location at which said change of course is to occur; and

self-controlling the mobile robot by the locomotion module such that said robot follows a straight line along said angle in said new direction of travel.

4,875,173

IMAGE ENLARGING METHOD AND DEVICE

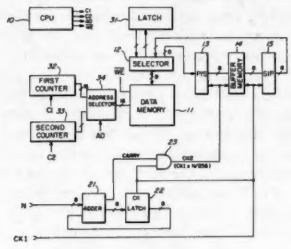
Akio Nakajima, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 15, 1986, Ser. No. 852,439

Claims priority, application Japan, Apr. 16, 1985, 60-81913; Apr. 16, 1985, 60-81914

Int. Cl.[4] G06F *3/15*

U.S. Cl. 364—518 **12 Claims**



12. Apparatus with limited memory capabilities for enlarging an image represented by digital data in order to provide a magnified image thereof comprising:

memory means for storing the data representative of the image;

means for defining the original position of the image to be enlarged;

means for defining the magnification of the image;

means for defining the resultant position of the desired magnified image displaced from the original position;

means for shifting the original position to another position when there is an overlap of the defined enlarged image position and the original position, and

means for transmitting data of the magnified image for storage in the same memory means whereby a magnified image is provided without loss of content and with limited use of memory capability.

4,875,174

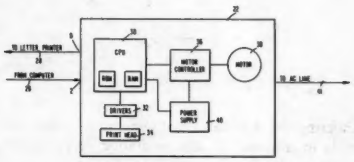
INSTANT LABEL PRINTER FOR HOST COMPUTER

Robert Olodort, Los Angeles; Charles Micalizzi, Capistrano Beach; Louis Cambruzzi, Placentia, and Randy Turchik, Laguna Hills, all of Calif., assignors to Print Things, Santa Monica, Calif.

Filed Mar. 6, 1987, Ser. No. 23,075

Int. Cl.[4] G06F *3/09*

U.S. Cl. 364—519 **10 Claims**



1. a label printing system for interfacing with a host computer, said host computer executing application programs, such as a word processing program, and including a keyboard, a display screen and screen driver means for driving said display screen, said label printing system comprising:

label printer means for recording data on a label;

printer control means providing control signals to drive said label printer means;

interface means for interfacing said label printer control means to said host computer; and

a control program executable by said host computer and independent of said application program for

(a) interrogating said screen driver means for data displayed on said display screen in response to the application program executed by said host computer;

(b) importing to said control program a portion of said displayed data to be printed on said label; and

(c) supplying the imported data portion to said printer control means.

4,875,175

METHOD AND DEVICE FOR ANALYZING AND MEASURING PHYSICAL PARAMETERS OF A LAYERED MATERIAL BY THERMAL RADIOMETRY

Michel Egee; Robert Dartois, both of Reims; Jean Marx, Cormontreuil; Etienne Merienne, Reims; Marcel Regalia, Reims; Philippe Poplimont, Reims, and Etienne Van Schel, Reims, all of France, assignors to Universite de Reims Champagne-Ardenne, Reims, France

Filed Feb. 5, 1987, Ser. No. 11,497

Claims priority, application France, Feb. 6, 1986, 86 01613

Int. Cl.[4] G01N *21/41*; G06F *15/20*

U.S. Cl. 364—551.01 **22 Claims**

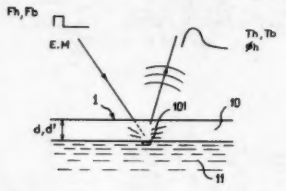
1. Method of analyzing and measuring by thermal radiometry physical parameters of a layered material comprising a base layer and a surface layer, wherein to determine said parameters such as the absorptivity B and diffusivity A of said surface layer and the thermal resistance R of the interface between said two layers of a sample relative to a reference sample having a surface layer of known thickness d' the method consists in:

(a) exciting the surface layer side of said reference sample by means of a flux of thermal energy amplitude modulated according to a periodic law at a high frequency Fh very much greater than a value for which the thermal diffusion length l' of said surface layer is small relative to the thickness d' of said surface layer.

(b) detecting the thermal signal generated by said reference

sample as a result of absorption and measuring the amplitude Th and phase shift ϕh of said thermal signal relative to the amplitude modulation excitation signal;

(c) exiting the surface layer side of said reference sample by means of a flux of thermal energy amplitude modulated according to a periodic law at a low frequency Fb such that said thermal diffusion length l' of said surface layer is approximately equal to its thickness;



(d) detecting the thermal signal generated by said reference sample in response to said excitation and measuring the amplitude Tb of said thermal signal; and

(e) determining the parameter A from the ratio of the amplitudes of said thermal signal at said low and said high frequencies, Tb/Th, and from the equation:

$$B\sqrt{A} = \frac{\tan\left(\phi + \frac{\pi}{2}\right)}{1 - \tan\left(\phi + \frac{\pi}{2}\right)} \sqrt{4\pi Fh}$$

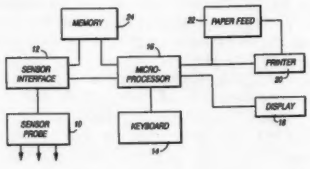
by interpolation using an array of values $d\sqrt{A}$, Tb/Th, $B\sqrt{A}$ and where ϕ represents the measured phase shift and then determining the parameter B.

4,875,176

METHOD AND APPARATUS FOR MEASURING SURFACE TEMPERATURES

Curtis L. Harsch, 13309 Pennypacker La., Fairfax, Va. 22033, and Kerry B. Beach, Herndon, Va., assignors to Curtis L. Harsch, Centreville, Va.

Filed Oct. 22, 1987, Ser. No. 111,753
Int. Cl.[4] G01K *1/02*
U.S. Cl. 364—557 **12 Claims**



1. An apparatus for measuring temperature across the surface of a tire comprising:

(a) three temperature sensors for sensing temperature of material along the surfaces simultaneously at three spaced locations;

(b) adjustable means for adjusting the location of each sensor;

(c) an interface means for converting analog temperature measurements of said sensing means to a digital output;

(d) a display for displaying simultaneously three separate representations of the temperatures sensed;

(e) a microprocessor;

(f) an operator keyboard for inputting commands into said microcomputer;

(g) memory means for storing data from said interface means corresponding to the digital output thereof;

(h) means for connecting said sensors, said microprocessor, said keyboard, and said memory means to a power source; and

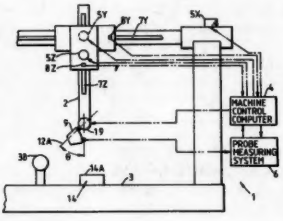
(i) said microprocessor cooperating with said interface means, said display, said power source, and said keyboard to display a representation corresponding to the temperatures sensed.

4,875,177

DATUMING OF ANALOGUE MEASUREMENT PROBES

Thomas B. Jarman, Cirencester, United Kingdom, assignor to Renishaw plc, Wotton-under-Edge, United Kingdom

Filed Oct. 2, 1987, Ser. No. 103,752
Claims priority, application United Kingdom, Oct. 8, 1986, 8624191
Int. Cl.[4] G01C *25/00*
U.S. Cl. 364—559 **8 Claims**



1. A method of datuming an analogue measurement probe in position determining apparatus, the probe having an output indicative of a distance of a surface of an object from the probe along a measurement axis of the probe when the distance is within a measuring range of the probe, the apparatus having means for moving the probe relative to the object and position determining means for taking a reading of the position of the probe with respect to at least one measurement axis of the apparatus, the method comprising:

(a) providing a test object having a datum point;

(b) moving the probe into a plurality of surface-sensing positions with respect to the test object and using the position determining means to take a first set and a second set of said readings, the readings within each set being in respect of different surface positions of the test object and being sufficient to make a determination from that set of readings of the position of said datum point of the test object, each reading of the first set being taken when the probe output indicates that the probe is substantially at a first point within its measuring range and each reading of the second set being taken when the probe output indicates that the probe is substantially at a second point within its measuring range;

(c) making a first determination of the position of said datum point of the test object from the first set of readings and a second determination thereof from the second set of readings; and

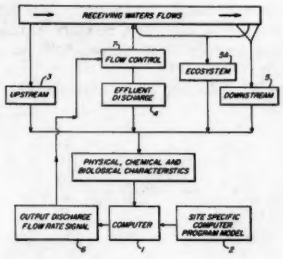
(d) deriving from the first and second determinations of the position of said datum point a correction factor for use in correcting the probe output for any angular deviation between the measurement axis of the probe and the measurement axis of the apparatus.

4,875,178

METHOD TO CONTROL THE DISCHARGE OF EFFLUENT

Leonard C. Cook, 9881 Tomahawk Trail, Wexford, Pa. 15090

Filed May 2, 1988, Ser. No. 189,023
Int. Cl.[4] G06G 7/48
U.S. Cl. 364—578 **12 Claims**



2. A method to control the discharge of effluent to receiving waters including the steps of determining the flow rate of effluent to be discharged to the receiving waters according to the expression:

$$F_{ed} = \frac{F_{dnstm} \times C_{dnstrm} - F_{upstrm} \times C_{upstm}}{C_{ed}}$$

where:

F_{ed} is equal to the flow rate of effluent discharge;

F_{dnstm} is equal to the flow rate of the receiving waters downstream of the effluent discharge;

C_{dnstm} is equal to the predetermined maximum allowable concentration of a substance in the receiving waters downstream of the effluent discharge;

F_{upstm} is equal to the rate of stream flow upstream of the effluent discharge;

C_{upstm} is equal to the concentration of the substance upstream of the discharge location; and

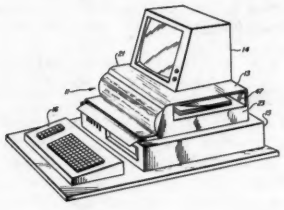
C_{ed} is equal to the concentration of the substance in the effluent discharge; and using a signal corresponding to a computed value of said F_{ed} for controlling the discharge of effluent to the receiving waters so as not to exceed predetermined water quality criteria of the receiving waters in the zone of influence.

4,875,179

READING ASSISTANCE DEVICE FOR WORD PROCESSOR

Gideon Gelman, 36/4 Arlozerov, Petah-Tiqwa, Israel (49208)

Filed Jul. 31, 1987, Ser. No. 80,441
Int. Cl.[4] B41J 11/38
U.S. Cl. 364—708 **9 Claims**



1. A reading assistance device for use with a word processing system including a video display terminal and for displaying written material from a length of paper, said device comprising:

a housing including a bottom for engaging a subtending horizontal support surface, a top for supporting said video display terminal, a central divider defining a retrieval compartment within said housing, a front having a transparent section for viewing said paper, an inlet for receiving said paper and means to access said compartment for removal of said paper;

guide means disposed in said housing for guiding said paper along a direct path from said inlet past said transparent section to said retrieval compartment without emerging from said housing so that the user can view selected portions of said paper; and

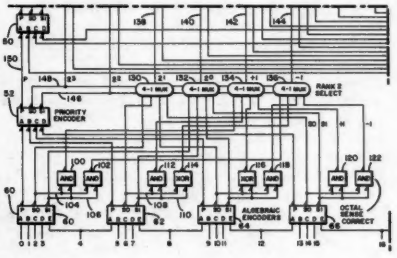
drive means disposed in said housing for engaging said paper and moving said paper along said guide means.

4,875,180

MULTI-FUNCTION SCALER FOR NORMALIZATION OF NUMBERS

Glen R. Kregness, Minnetonka, and Walter L. Quinton, White Bear Lake, both of Minn., assignors to Unisys Corporation, Blue Bell, Pa.

Filed May 9, 1988, Ser. No. 192,081
Int. Cl.[4] G06F 7/38
U.S. Cl. 364—715.03 **8 Claims**



1. A scaler for the justification of binary numbers having an excess number of sign bits comprising,

encoding means partitioned into a plurality of sub-encoding means wherein a first sub-encoding means receives the most-significant sign bit of the number, and a plurality of the next most-significant bits of the number, and the remaining sub-encoding means of said plurality, and each receives a number of successive bits of the binary number which are equal in number to the number of next most-significant bits plus the sign bit that is supplied to said first encoding means, and all of the bits of the number are supplied to said encoding means, each of said sub-encoding means being constructed so that an output signal is provided which indicates whether or not all of the bits supplied to said sub-encoding means are of the same value as the most-significant bit applied to said sub-encoding means, and an output count that signifies which of the bits supplied to said sub-encoding means is the next most-significant bit that differs in value from the most-significant bit supplied to said sub-encoding means, and

scale count means coupled to said encoding means for providing a scale count representation of the number of next most-significant bits of said binary number that are of the same value as said most-significant sign bit.

4,875,181

METHOD OF APPARATUS FOR REALIZING A LOGICAL OPERATION BY MODIFYING A FLOW OF ENERGY

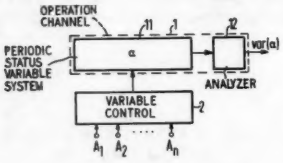
Friedrich-Wilhelm Hagemeyer, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 767,072, Aug. 19, 1985, abandoned, which is a continuation of Ser. No. 393,050, Jun. 28, 1982, abandoned. This application Jun. 9, 1987, Ser. No. 60,936

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1981, 3132623

Int. Cl.[4] G06F *7/56*

U.S. Cl. 364—716 **13 Claims**



1. A logical operation system, comprising:

an operation channel means having a status variable associated therewith whose value can be selectively changed by variable control signals input to the operation channel means, said operation channel means having an output at which the selectively changed status variable is present;

analyzer means connected to said output of the operation channel means for providing logical values at its output according to an evaluation function applied to the selectively changed status variable output from the operation channel means; and

variable control means connected to said operation channel means for providing said variable control signals thereto, said variable control means having logical variable signals input thereto and operation control signals input thereto, said variable control means employing the logical variable signals and the operation control signals for varying the variable control signals such that the logical variable signals cause changes of the status variable and a magnitude of said changes is varied by the operation control signals, and said variable control means determining a selective change from one logical operation to a completely different logical operation based on values of the operation control signals.

4,875,182

MINIATURE DIGITAL COMPUTER CIRCUIT FOR DETERMINING VALUES OF COMBINED VARYING QUANTITIES

Yu-Tsang G. Hwang, Dix Hills, N.Y., assignor to Republic Electronics Company, Hauppauge, N.Y.

Filed Jul. 13, 1987, Ser. No. 73,004

Int. Cl.[4] G06F *15/328*

U.S. Cl. 364—732 **5 Claims**

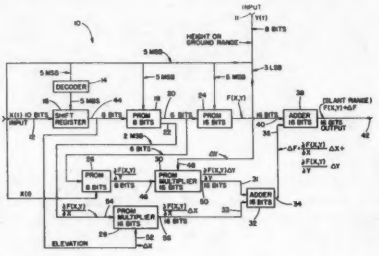
1. A miniature digital computer circuit comprising:

first and second sources of digital data signals respectively representing a first function having the format X(t), where X(t) is a function of t which is a continually varying first quantity, and a second function having the format Y(t), where Y(t) is a second function of t which is a continually varying second quantity, said digital data signals having the format of two trains of successive groups of pulses, said groups of pulses in each of said trains having a prescribed number of bits;

first and second pulse readout memory means connected to said first and second data signal sources and arranged to produce first and second partial derivative digital readouts having the respective formats $\partial F(X,Y)/\partial X$ and $\partial F(X,Y)/\partial Y$, where $\partial F(X,Y)/\partial X$ and $\partial F(X,Y)/\partial Y$ represent the partial derivatives of the function F(X,Y) taken only with respect to said first and second functions, and ∂X, ∂Y represent the partial differentials of said first and second varying quantities;

first digital multiplier means connected to said first memory means and said first data signal input source for receiving therefrom and multiplying said first partial derivative of digital readout data pulses by ΔX, where ΔX represents the instantaneous change in quantity X from instant to instant, to produce a first digital multiplication product having the format $\partial F(X,Y)/\partial X\ \Delta X$;

second digital multiplier means connected to said second



memory means and said second data signal input source for multiplying said second partial derivative digital readout data pulses by ΔY, where ΔY represents the instantaneous change in said second quantity from instant to instant, to produce a second digital multiplication product having the format $\partial F(X,Y)/\partial Y\ \Delta Y$; and

digital adder means connected to said first and second multiplier means to receive said digital multiplication products therefrom and to add said products together to produce a digital sum having the format $\Delta F(X,Y)$, where

$\Delta F(X,Y)=\partial F(X,Y)/\partial X\ \Delta X+\partial F(X,Y)/\partial Y\ \Delta Y$, and where $\Delta F(X,Y)$

represents the two first order terms of the partial derivative expansion of the function F(X,Y).

4,875,183

NEURAL NETWORKS

Hans P. Graf, North Middletown, and Richard E. Howard, Highland Park, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

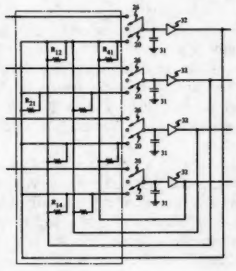
Filed Nov. 19, 1987, Ser. No. 122,870

Int. Cl.[4] G06G *7/02*

U.S. Cl. 364—807 **9 Claims**

1. A process for the parallel processing of signals by a neural network, said neural network comprising (a) a multiplicity of inputs for a matrix with rows and columns connected by interconnected elements and (b) active elements interacting with said matrix, said processes comprising the steps of (1) applying a signal to said multiplicity of inputs wherein switches present in said matrix are located such that each of said inputs is made between a switch in said matrix and the input of one of said

active elements and such that, with the switch open, essentially no processing of information occurs, and (2) closing said



switches wherein the parallel processing of said applied inputs is initiated.

4,875,184

FUZZY LOGIC COMPUTERS AND CIRCUITS

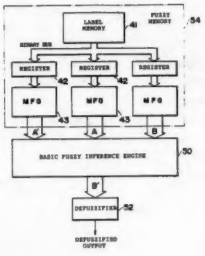
Takeshi Yamakawa, Kumamoto, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Nov. 5, 1987, Ser. No. 116,777

Claims priority, application Japan, Nov. 13, 1986, 61-268564

Int. Cl.[4] G07G *7/00*

U.S. Cl. 364—807 **8 Claims**



1. A fuzzy computer comprising:

a plurality of fuzzy membership function generator circuits, each of said fuzzy membership generator signal distributed on a plurality of lines which represents a predetermined fuzzy membership function, and

a fuzzy inference engine which receives as inputs the electric signals outputted by said plurality of fuzzy membership function generator circuits, said fuzzy inference engine executing a predetermined fuzzy operation and for outputting the result of said operation as an electric signal distributed on a plurality of lines.

4,875,185

WORKSTATION FOR A VISION-IMPAIRED USER WITH INTERFACE FOR SELECTIVELY FEEDING DISPLAY DATA FROM A BUS OR A CONNECTED COMPUTER

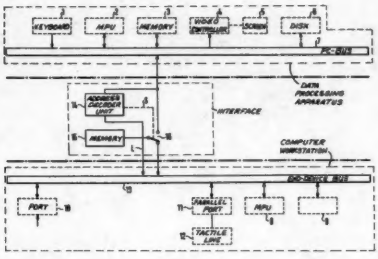
Hans-Jürgen Bornschein, Schwerte, Fed. Rep. of Germany, assignor to F. H. Papenmeier GmbH & Co. KG, Schwerte, Fed. Rep. of Germany

Filed Nov. 17, 1986, Ser. No. 931,674

Claims priority, application Fed. Rep. of Germany, Nov. 18, 1985, 3540878; Mar. 7, 1986, 3607549

Int. Cl.[4] G06F *13/38, 3/14*

U.S. Cl. 364—900 **18 Claims**



1. A computer workstation for a vision-impaired user for connection to a data processing apparatus which includes a microprocessor, data input means, memory storage means, visual output means and at least a data bus connecting said microprocessor, data input means, memory storage means and visual output means for transmission of data therebetween, said workstation comprising:

a workstation microprocessor;

main memory means for storing data:

display means for representing at least one of auditory, visual and tactile information for recognition by a vision-impaired user; and

interface means for connecting said workstation to the data processing apparatus so that information displayed on the visual output means of the data processing apparatus is also represented on said workstation display means for a vision-impaired user, said interface means being connected to the data bus of the data processing apparatus and comprising:

interface memory means for storing data; and

data transfer controller comprising: means for sensing that particular data being transmitted on the data processing apparatus data bus is directed to the visual output means, means for feeding the sensed data which is directed to the visual output means from the data bus to said interface memory means so as to store said sensed data in said interface memory means, means for sensing the cessation of said data transmission on the data bus to the visual output means, and means for causing the data stored in said interface memory means to be fed, after said cessation of data transmission, to said display means for representation by said display means for recognition by a vision-impaired user.

4,875,186

PERIPHERAL EMULATION APPARATUS

Carl R. Blume, Jr., Newton, Mass., assignor to Prime Computer, Inc., Natick, Mass.

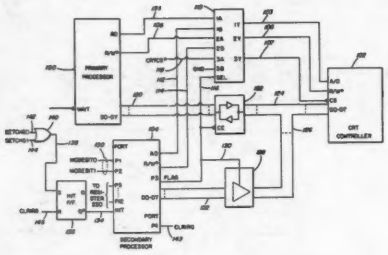
Filed Feb. 28, 1986, Ser. No. 834,751

Int. Cl.[4] G06F *13/00*

U.S. Cl. 364—900 **19 Claims**

1. In a data processing system having a first processor generating address and data signals, at least one peripheral unit

having a plurality of registers for storing parameter data which controls the operation of said peripheral unit, at least selected ones of said registers being device specific registers, and means responsive to said address and said data signals for transferring said parameter data from said first processor to said registers, apparatus for allowing a software program written for use with a different peripheral unit to operate with said peripheral unit, said apparatus comprising



means responsive to said address and said data signals for generating a flag signal when said parameter data is being transferred from said first processor to said device specific registers;

means responsive to said flag signal for temporarily disconnecting said first processor from said peripheral unit; and

means responsive to said address and data signals for providing and writing alternate parameter data into said device specific registers.

4,875,187

PROCESSING APPARATUS FOR GENERATING FLOW CHARTS

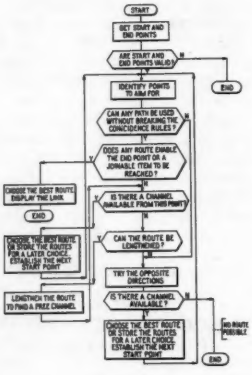
Carolyn M. Smith, Ipswich, England, assignor to British Telecommunications, plc, London, England

Filed Jul. 29, 1987, Ser. No. 78,945

Claims priority, application United Kingdom, Jul. 31, 1986, 8618665

Int. Cl.[4] G06F *15/20*

U.S. Cl. 364—900 **9 Claims**


START
GET START AND END POINTS
ARE START AND END POINTS VALID?
END
IDENTIFY POINTS TO AIM FOR
CAN ANY PATH BE USED WITHOUT BREAKING THE COINCIDENCE RULES?
DOES ANY ROUTE ENABLE THE END POINT OR A JOINABLE ITEM TO BE REACHED?
CHOOSE THE BEST ROUTE, DISPLAY THE LINK
END
IS THERE A CHANNEL AVAILABLE FROM THIS POINT
CHOOSE THE BEST ROUTE OR STORE THE ROUTES FOR A LATER CHOICE, ESTABLISH THE NEXT START POINT
CAN THE ROUTE BE LENGTHENED?
TRY THE OPPOSITE DIRECTIONS
LENGTHEN THE ROUTE TO FIND A FREE CHANNEL
IS THERE A CHANNEL AVAILABLE?
CHOOSE THE BEST ROUTE OR STORE THE ROUTES FOR A LATER CHOICE, ESTABLISH THE NEXT START POINT
NO ROUTE POSSIBLE
END

1. Apparatus for generating a flow chart consisting of boxes, joined by connecting links, the apparatus comprising:

A. a data processing unit;

B. an input device connected to said data processing unit; and

C. a display device which is also connected to said data processing unit and which has vertical and horizontal axes;

the data processing unit including means for causing display on the display device of a plurality of boxes and means for accepting from the input device data identifying a starting box and an end box, the processing unit further comprising means for causing display on the display device of a connecting link between the starting box and the end box, said data processing unit also including:

(a) means for defining a link start point associated with the starting box, and a link end point associated with the end box; (b) means for calculating whether first and second lines joining the link start point and respective first and second intermediate target points are obstructed by a non-permitted obstacle, said lines being parallel respectively to the horizontal and vertical axes of the display device, and having a length equal respectively to horizontal and vertical displacement of the link end point from the link start point, such that said intermediate target points may be joined to the link end point by respectively third and fourth lines parallel respectively to the vertical and horizontal axes;

(c) means for determining when no such obstacle is discovered, whether the said third and fourth lines joining said intermediate target pints, and the link end point, are obstructed by non-permitted obstacles, and for generating when no obstacle is encountered to the third and fourth lines, a connecting link on the display device, composed of the first and third, or of the second and fourth said lines;

(d) means for determining, when either said first and said second lines are obstructed, whether a channel exists which is not obstructed by non-permitted obstacles, said channel joining the respective first or second line, and a line parallel thereto, and displaced therefrom by respectively vertical or horizontal displacement of the link start point from the link end point; and

(e) means for storing a value to indicate the first and second lines respectively to be allowable, in accordance with whether or not a corresponding channel is found to exist for said lines respectively, and means for defining a junction of the channel with the respective first or second line as a new start point, in construction of a desired connecting link.

4,875,188

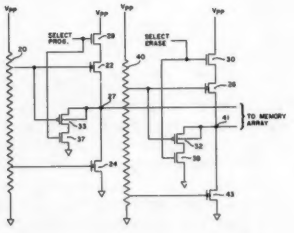
VOLTAGE MARGINING CIRCUIT FOR FLASH EPROM

Owen W. Jungroth, Sonora, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed Jan. 12, 1988, Ser. No. 144,567

Int. Cl.[4] G11C *11/34, 11/00, 7/00*; H02J *1/10*

U.S. Cl. 365—185 **15 Claims**



1. An electrically erasable and electrically programmable read-only memory fabricated on a silicon substrate and having a plurality of memory cells each of which has a floating gate,

an improvement for verifying erasing and programming comprising:

first circuit means incorporated on said substrate for providing a first potential lower than the potential used for programming said cells, said first potential being coupled to said cells to verify that said cells have been programmed, said first circuit means comprising: first and second field-effect transistors coupled in series and matched to one another; a first resistor means coupled to a programming potential for developing said first potential and a bias potential, the gates of said first and said second transistors being coupled to said first resistor means such that the gate of said first transistor is approximately at said first potential and the gate of said second transistor is at said bias potential, a first node disposed between said first transistor and said second transistor providing said first potential,

second circuit means incorporated on said substrate for providing a second potential lower than said first potential, said second potential being coupled to said cells to verify that said cells have been erased, said second circuit comprising: third and fourth field-effect transistors coupled in series and matched to one another; a second resistor means coupled to a programming potential for developing said second potential and a second bias potential, the gates of said third and said fourth transistors being coupled to said second resistor means such that the gate of said third transistor is approximately at said second potential and the gate of said fourth transistor is at said second bias potential; said second potential being provided at a second node disposed between said third and fourth transistors;

a selection means for selecting said first circuit means to transfer said first potential from the gate of said first transistor to said first node to verify that said cells have been programmed, and for selecting said second circuit means to transfer said second potential from the gate of said third transistor to said second node to verify that said cells have been erased.

4,875,189

RANDOM ACCESS MEMORY DEVICE WITH NIBBLE MODE OPERATION

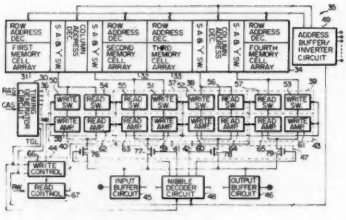
Takashi Obara, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jan. 28, 1988, Ser. No. 149,282

Claims priority, application Japan, Jan. 28, 1987, 62-19293

Int. Cl.[4] G11C *8/00*

U.S. Cl. 365—189.04 **7 Claims**



1. A random access memory device with a read-out mode operation and a write-in mode operation, said write-in mode operation having a random access stage followed by a simultaneous access stage, comprising:

(a) plural memory cell arrays each having a plurality of memory cells arranged in rows and columns;

(b) addressing means operative to produce a bit control signal and internal address signals specifying certain memory cells each selected from each memory cell array for said read-out mode operation and said write-in mode operation, one of said certain memory cells being directly specified by a row address signal and a column address signal supplied from an external source;

(c) plural read/write switching circuits associated with said plural memory cell arrays, respectively, each of said read/write switching circuits being provided with a write-in switch and a read-out switch which are capable of electrically connecting each of said certain memory cells through said addressing means;

(d) plural data amplifier circuits paired with said read/write switching circuits, respectively, each of said data amplifier circuits being provided with a write data amplifier and a read data amplifier which are coupled to said write-in switch and said read-out switch, respectively;

(e) a data input buffer circuit supplied with a new data bit from said external source;

(f) a data output buffer circuit operative to transfer data bits preserved in said certain memory cells to an external destination in sequence;

(g) switching means provided with plural switching transistors having respective conduction paths coupled at one ends thereof to said data amplifier circuits, respectively, and at the other ends thereof to said data input buffer circuit or said data output buffer circuit;

(h) a data control circuit responsive to said bit control signal and operative to cause one of said switching transistors to turn on in said write-in mode operation, said data control circuit being further operative to cause said switching transistors to successively turn on in said read-out mode operation; and

(i) a read/write control circuit operative to produce first and second activation signals the former of which is supplied to said write-in switches and said write data amplifiers for activation and the latter of which is supplied to said read-out switches and said read data amplifiers, said first activation signal allowing said write-in switch of one of said read/write switching circuit and said write data amplifier of one of said data amplifier circuits to transfer said new data bit to said memory cell directly specified by said row and column address signals in said random access stage, said second activation signal allowing said read-out switches of said read/write switching circuits except for said one of said read/write switching circuits and said read data amplifiers of said data amplifier circuits except for said one of said data amplifier circuits to read out said data bits from said certain memory cells except for said certain memory cell directly specified by said row and column address signals in said random access stage, said first activation signal allowing all of said write-in switches and all of said write data amplifiers to write said new data bit and said data bits into certain memory cells.

4,875,190

TWO-DIMENSIONAL MEMORY UNIT HAVING A 2D ARRAY OF INDIVIDUALLY ADDRESSABLE BLOCKS EACH HAVING A 2D ARRAY OF CELLS

Yukio Sakano, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Dec. 21, 1987, Ser. No. 135,349

Claims priority, application Japan, Dec. 26, 1986, 61-310101

Int. Cl.[4] G11C *7/00*

U.S. Cl. 365—189.04 **8 Claims**

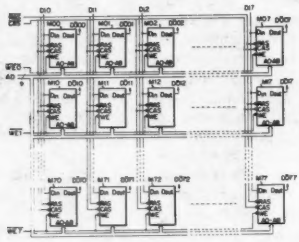
1. A two-dimensional memory device comprising:

memory block means comprising a plurality of individually addressable memory blocks, each memory block having a plurality of memory cells arranged along each of at least two axes in at least one of a square and a non-square array of selectable dimensions;

memory block assembly means comprising a plurality of said memory block means arranged along each of at least two axes;

address information generating means for generating address

information for at least one of a data reading and a data writing cycle with respect to each of said axes of said memory block assembly means, and control means for selectively causing said address information with respect to each respective memory block means simultaneously access all memory cells of said respective memory block



means during at least one of said data writing and data reading cycle; and

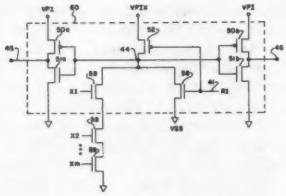
data input and output control means for performing selection control on data which are inputted or outputted from a memory cell group of a respective memory block means which is accessed by said address information generating means during at least one of data writing and data reading.

4,875,191

INTEGRATED READ AND PROGRAMMING ROW DRIVER

Theodor Mulder, Milpitas, and Ronald W. Swartz, Granite Bay, both of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Filed Jul. 21, 1988, Ser. No. 222,408
Int. Cl.[4] G11C *13/00*
U.S. Cl. 365—189.01 **12 Claims**



12. In a CMOS erasably programmable logic device having two memory arrays, a read and programming driver for driving a corresponding word line of each array, comprising:

a first output inverter having two transistors, a first p-channel transistor having its souce coupled to a first power source, its drain coupled to a first word line, and its gate coupled to a node; and a first n-channel transistor having its source coupled to a power return, its drain coupled to said first word line, and its gate coupled to said node, such that a potential on said node controls said first output inverter;

a second output inverter having two transistors, a second p-channel transistor having its source coupled to said first power source, its drain coupled to a second word line, and its gate coupled to said node, and a second nchannel transistor having its source coupled to said power return, its drain coupled to said second word line, and its gate coupled to said node, such that said potential said node controls said second output inverter;

a third p-channel transistor having its source coupled to a second power source, its drain coupled to said node, and its gate coupled to a read signal;

a third n-channel transistor having its source coupled to said power return, its drain coupled to said node, and its gate coupled to said read signal; such that said read signal activates one of said third n-channel and p-channel transistors to control said potential on said node duriing a read cycle;

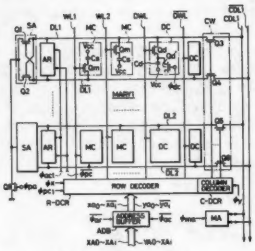
a plurality of n-channel programming transistors coupled in series between said node and said return and being in parallel to said third n-channel transistor, wherein durig a programming cycle said third p-channel transistor is activated and said third n-channel transistor is deactivated, such that said programming transistors control said potential on said node.

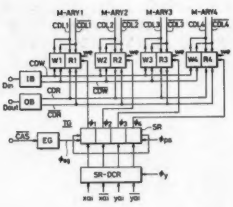
4,875,192

SEMICONDUCTOR MEMORY WITH AN IMPROVED NIBBLE MODE ARRANGEMENT

Tetsuro Matsumoto, Tachikawa, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 685,553, Dec. 24, 1984, abandoned. This application Nov. 30, 1987, Ser. No. 127,621
Claims priority, application Japan, Dec. 23, 1983, 58-241966
Int. Cl.[4] G11C *7/00, 8/00*
U.S. Cl. 365—193 **15 Claims**





1. A semiconductor memory comprising:

a plurality a memory arrays each of which includes a plurality of dynamic memory cells;

a plurality of read circuits coupled respectively to said memory arrays;

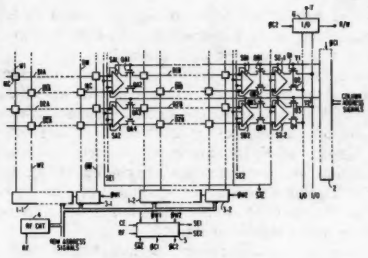
a timing generator which detects every change in a column address strobe signal applied to said semiconductor memory, wherein said timing generator includes means to form timing signals in response to said detected changes; and

a control circuit which, upon receipt of said timing signals, produces control signals to successively operate said plurality of read circuits so that said semiconductor memory successively produces output data in synchronism with every change in said column address strobe signal in read operation.

4,875,193
SEMICONDUCTOR MEMORY WITH IMPROVED CELL ARRANGEMENT

Machio Segawa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Dec. 28, 1987, Ser. No. 138,482
Claims priority, application Japan, Dec. 25, 1986, 61-309763
Int. Cl.[4] G11C *13/00*
U.S. Cl. 365—207 6 Claims



1. A semiconductor memory device comprising:

a pair of bit lines, said pair of bit lines being divided into a first pair of sub-bit lines and a second pair of sub-bit lines, first memory cells coupled to said first pair of sub-bit lines, second memory cells coupled to said second pair of sub-bit lines, first word lines intersecting with said first pair of sub-bit lines and coupled only to said first memory cells, second word lines intersecting with said second pair of sub-bit lines and coupled only to said second memory cells, a first sense amplifier having a pair of input terminals connected to said first pair of sub-bit lines, a second sense amplifier having a pair of input terminals connected to said second pair of sub-bit lines, means for selecting one of said first and second word lines,

a pair of bus lines, a pair of first switches coupled between said first pair of sub-bit lines and said second pair of sub-bit lines to control an electrical connection between said first and second pairs of sub-bit lines, a third sense amplifier having a pair of input terminals, a pair of second switches coupled between said second pair of sub-bit lines and the pair of input terminals of said third sense amplifier, a pair of third switches coupled between said pair of bus lines and the pair of input terminals of said third sense amplifier, first means for selectively enabling said pair of third switches in accordance with column address information, second means for operatively enabling said pair of first switches and said pair of second switches simultaneously only when said pair of third switches are enabled, third means for operatively enabling said first sense amplifier when said pair of third switches are not enabled and one of said first word lines is selected and enabling said second sense amplifier when said pair of third switches are not enabled and one of said second word lines is selected.

4,875,194
SEMICONDUCTOR MEMORY DEVICE WITH PROTECTION CELLS

Tatsunori Murotani, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Feb. 26, 1988, Ser. No. 160,982
Claims priority, application Japan, Feb. 26, 1987, 62-44296
Int. Cl.[4] G11C *7/02*
U.S. Cl. 365—210 8 Claims

1. A semiconductor memory device fabricated on a semiconductor substrate, comprising:

(a) a memory cell array having a plurality of memory cells each capable of preserving a data information in the form of electric charges, said memory cells being arranged in rows and columns;

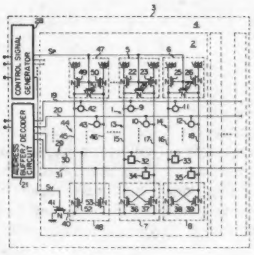
(b) a plurality of bit line pairs each associated with said memory cells in two of said columns and having first and second bit lines coupled to said memory cells in said two of said columns, respectively;

(c) charging means operative to supply each of said bit line pairs with electric charges for equalizing said first bit line to said second bit line;

(d) a plurality of word lines each coupled to said memory cells in each row;

(e) reference means operative to supply said first bit lines or said second bit lines with a reference information upon activation thereof;

(f) peripheral circuits including an addressing circuit operative to activate said reference means, said addressing circuit being operative to activate one of said word lines so as to allow said memory cells coupled thereto to be electrically connected to said second bit lines or said first



bit lines for transferring said data information, a difference voltage taking place between said first and second bit lines of each bit line pair on the basis of said data information and said reference information;

(g) a plurality of sense amplifier circuits each associated with each of said bit line pairs and operative to decide a logic level of said data information on the basis of said difference voltage between said first and second bit lines of each bit line pair when the sense amplifier circuit is activated;

(h) interconnecting means operative to couple said sense amplifier circuits to a constant voltage source for activation of said sense amplifier circuits; and

(i) protection cells located between said peripheral circuits and said memory cell array and capable of preserving dummy information each in the form of electric charges, said protection cells being coupled to one of said bit line pairs, one of said sense amplifier circuits associated with said one of said bit line pairs being directly controlled by said addressing circuit when said addressing circuit activate said reference means and said one of said word lines.

4,875,195
SEMICONDUCTOR DEVICE WITH A REFERENCE VOLTAGE GENERATOR

Masaki Momodomi, Yokohama, and Koji Sakui, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

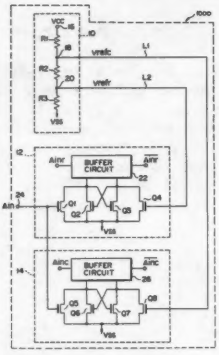
Filed May 5, 1987, Ser. No. 46,155
Claims priority, application Japan, May 6, 1986, 61-103404
Int. Cl.[4] G11C *8/00*
U.S. Cl. 365—230.08 21 Claims

1. A semiconductor integrated circuit device provided on a semiconductive chip substrate, said device comprising:

first semiconductor transistor-circuit means, for receiving a first input voltage and determining a logical level of said first input voltage;

second semiconductor transistor-circuit means, for receiving a second input voltage and determining a logical level of said second input voltage; and

voltage-generating means connected to said first semiconductor transistor-circuit means by elongated wiring lines, for receiving a power-supply voltage and constantly generating different voltages lower than said power-supply voltage, said different voltages being supplied as first and second semiconductor transistor-circuit means, respectively, and said voltage-generating means including resistive elements connected in series and having nodes at which said first and second reference voltages are generated.

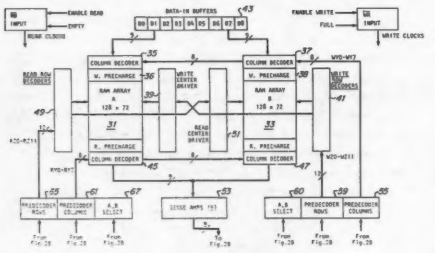


4,875,196

METHOD OF OPERATING DATA BUFFER APPARATUS

Dieter W. Spaderna, Aloha, Oreg., and Jeffrey L. Miller, Vancouver, Wash., assignors to Sharp Microelectronic Technology, Inc., Vancouver, Wash.

Filed Sep. 8, 1987, Ser. No. 93,969
Int. Cl.[4] G11C *8/00, 7/00*
U.S. Cl. 365—238 **4 Claims**



1. A method of operating a plurality of arrays for dual-ported randomly-accessable memory cells having read and write word lines and read and write bit lines per memory cell to which a data signal is written and from which a data signal is read by precharging of bit lines during an interval, and in response to control signal applied to a word line thereof during another interval, where the memory cells have the associated write word lines and the read word lines arranged in consecutive rows and have the associated read bit lines and the write bit lines arranged in columns in each array, the method comprising the steps of:

applying wirte word line control signals to all of the memory cells arranged in a selected row in one of the arrays during one write interval;

precharging during said one write interval the write bit lines of the memory cells arranged in another of the arrays while control signal for said write word llines is absent from all of the memory cells in said another array;

writing data signals to the memory cells arranged in selected columns within said one array along the selected row by accessing a number of the columns of memory cells in said one array during said one write interval for writing data signal therein;

applying write word line control signals to all of the memory cells arranged in a selected row in said another of the arrays during another write interval;

precharging during said another write interval the write bit lines of the memory cells arranged in said one of the arrays while control signal for the write word lines is absent from all of the memory cells in said one of the arrays;

writing data signals to the memory cells arranged in selected columns within said another array along the selected row by accessing a number of the columns of memory cells in said another array during said another write interval for writing data signals therein;

applying read word line control signals to all of the memory cells arranged in a selected row in said one of the arrays during one read interval that is independent of said one and said another write intervals;

precharging during said one read interval the read bit lines of the memory cells arranged in another of the arrays while control signal for said read word lines is absent from all of the memory cells in said another array;

reading data signals from the memory cells arranged in selected columns within said one array along the selected row by accessing a number of the columns of memory cells in said one array during said one read interval for reading data signals therein;

applying said read word line control signals to all of the memory cells arranged in a selected row in said another of the arrays during another read interval that is independent of said one and said another write intervals;

precharging during said another read interval the read bit lines of the memory cells arranged in said one of the arrays while control signal for said read word lines is absent from all of the memory cells in said one of the arrays; and

reading data signals from the memory cells arranged in selected columns within said another array along the selected row by accessing a number of the columns of memory cells in said another array during said another read interval for reading the data signals therein.

4,875,197

METHOD AND APPARATUS FOR DETERMINING PROPAGATION VELOCITIES OF ELASTIC WAVES IN A BOREHOLE

Eike Rietsch, Houston, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Jan. 31, 1983, Ser. No. 462,169
Int. Cl.[4] G01V *1/40*
U.S. Cl. 367—32 **5 Claims**

1. Method of determining propagation velocities of a plurality of different elastic waves in a borehole, comprising

generating said elastic waves at a single frequency at a location in said borehole,

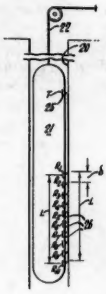
receiving signals from said elastic waves at a plurality of locations spaced at predetermined distances from said generating location,

digitally multiplexing said signals at a scan rate that is high relative to said frequency,

recording said multipled signals, and

analyzing said recorded multiplexed signals to determine the wave lengths of said different elastic waves by measuring

each whereby said propagation velocity of each different elastic wave is determined from the fundamental relationship $v=f\lambda$ where v is velocity f is frequency and λ is wave length.

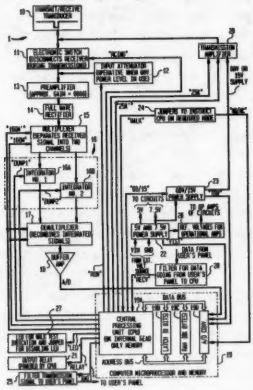


4,875,198

INTRUSION DETECTION APPARATUS

Arie Ariav, Kochav Michael, Israel, assignor to I.D. Tech Ltd., Israel

Filed Oct. 7, 1988, Ser. No. 255,119
Int. Cl.[4] G08B *13/18*
U.S. Cl. 367—93 **37 Claims**



1. An intrusion detection apparatus, comprising:

(A) means including an antenna for transmitting spaced pulses of radiation energy of a given frequency throughout a region to be protected;

(B) means for receiving radiation energy reflected from the protected region, said reflected radiation energy being received between adjacent spaced pulses in the form of an AC analog signal at said given frequency, the peaks and valleys of which signal vary in amplitude with time;

(C) means for allocating a portion of the time occurring between transmitted pulses into a plurality of time segments each of which segments is long enough to correspond to at least one cycle of said analog signal;

(D) means for integrating the portion of the signal in each of said time segments to arrive at an integral value for each of said segments;

(E) means for converting said integral values into corresponding digital values;

(F) means for storing said digital values in memory;

(G) means for comparing the stored digital values obtained from the reflected energy of a first transmitted pulse with the corresponding digital values obtained from the reflected energy of an adjacent second transmitted pulse;

(H) means for storing the absolute differences obtained between corresponding integral values for each of said time segments; and,

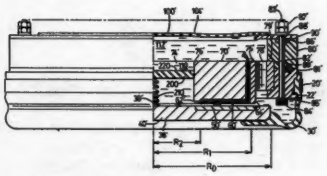
(I) means responsive to predetermined changes in said absolute differences for a predetermined number of time segments for initiating an intrusion signal in said apparatus.

4,875,199

DEEP WATER TRANSIENT SOUND GENERATOR

Roger W. Hutchins, 88 Duplex Avenue, Toronto, Ontario, Canada (M5P 2A4)

Continuation-in-part of Ser. No. 904,435, Sep. 9, 1986, abandoned. This application Aug. 4, 1988, Ser. No. 228,151
Int. Cl.[4] H04R *15/00*
U.S. Cl. 367—175 **8 Claims**



1. An underwater pulse generator capable of generating large amplitude pulses and having input powers in the range of 100,000 to 1,000,000 watts, said generator comprising:

(1) a coil;

(2) a support body defining a rear support for said coil; said support body having a large central hole and one or more relatively smaller holes arranged about the periphery of the coil carrying support of the support body;

(3) a piston;

(4) a driver carried by said piston;

(5) a resilient piston seal between said support body and said piston;

(6) a resilient rear diaphragm at the rear of said support body, said resilient piston seal and said resilient rear diaphragm defining, in combination with said piston and said support body, a watertight pressure transfer space at the rear of said piston;

(7) a substantially incompressible pressure transfer liquid located within said pressure transfer space;

(8) means for energizing said coil to rapidly displace said driver, and thereby said piston to a forward position; and

(9) a spring located between said piston and said support body for restoring said piston to a normal position;

and when said generator is in use, said pressure transfer liquid flowing at subsonic velocity during said rapid displacement of said piston from said coil upon said coil being energized, said pressure transfer liquid, in combination with said spring critically dampening said piston upon said piston returning to said normal position.

4,875,200

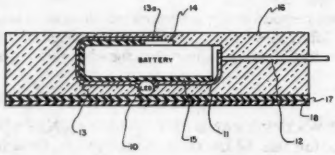
ILLUMINATING BEZEL

John T. Tillery, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 1, 1988, Ser. No. 265,446
Int. Cl.[4] G04B *19/30*
U.S. Cl. 368—67 **3 Claims**

1. A stick-on illuminating bezel for a meter, gauge or the like

having a scale, dial, or face covered by a crystal, said bezel including the series connection of a wafer battery, a pressure switch, and a light-emitting diode, all encapusated in an elastomeric covering transparent on at least a portion covering said light-emitting diode, a transparent pressure-sensitive adhesive on said portion, and



a peelable protective layer on said pressure-sensitive adhesive, whereby said layer is peeled from said pressure-sensitive layer in order that said device may be adhered to said crystal, and whereby said bezel has an area which is small with respect to the area of said crystal.

4,875,201

ELECTRONIC PULSE TIME MEASUREMENT APPARATUS

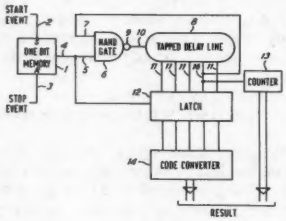
David T. Dalzell, Shiplake, England, assignor to Logic Replacement Technology, Limited, Berkshire, England

Filed Jul. 21, 1988, Ser. No. 222,413

Claims priority, application United Kingdom, Jul. 21, 1987, 8717173

Int. Cl.[4] G04F *8/00*

U.S. Cl. 368—120 **12 Claims**



1. Time measurement apparatus comprising:

a delay line having an input tap and a plurality of further taps,

a latch associated with each of the further taps of the delay line,

an inverting AND gate having an output connected to the input tap of the delay line,

means for connecting an input signal capable of indicating at least first and second conditions, to a first input of the AND gate,

means connecting a later tap of the delay line with a second input of the inverting AND gate, thereby to cause oscillation of the delay line in the presence of the said first condition at the first input of the inverting AND gate,

a counter for counting the said oscillations of the delay line,

means for causing each of the latches to operate simultaneously on application of the second signal condition to the first input of the inverting AND gate, and

means for deriving from the value stored in the counter and the pattern stored in the latches the duration of the first condition of the input signal.

4,875,202

DISK-TYPE STORAGE MEDIUM RECORDING/REPRODUCING APPARATUS

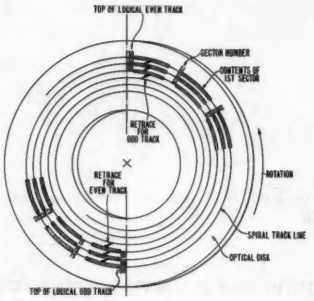
Toshikazu Kodo, Neyagawa, and Shinichi Tanaka, Kyoto, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 27, 1987, Ser. No. 20,036

Claims priority, application Japan, Mar. 7, 1986, 61-51146

Int. Cl.[4] G11B *17/22*

U.S. Cl. 369—32 **8 Claims**



1. An information recording/reproducing apparatus comprising:

a disk-type storage medium having a spiral track each one turn of which has a predetermined number of sectors, wherein said spiral track is divided into a plurality of subtracks each containing therein a smaller number of said sectors than said predetermined number, each sector in each subtrack having an identifier area for storing a track address showing an address of said each subtrack and a sector address showing an address of each said sector in said each subtrack;

a rotating means for rotating said storage medium;

a head for writing information data into said storage medium and reading recorded data from said storage medium;

a head moving means for moving said head so as to traverse said spiral track, said head moving means normally moving said head in a forward direction so that said head traces said spiral track to write information data into or read recorded data from said storage medium; and

a track jump control means for controlling said head moving means to execute a track jump for moving said head to jump in a backward direction after tracing a desired subtrack to trace again said desired subtrack.

4,875,203

TRACKING SERVO SIGNAL GENERATING DEVICE FOR AN OPTICAL DISC

Yoshinari Takamura, Osaka; Kazuaki Obara, Kadoma, and Michiyoshi Nagashima, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 13, 1987, Ser. No. 2,952

Claims priority, application Japan, Jan. 16, 1986, 61-6704

Int. Cl.[4] G11B *7/00*

U.S. Cl. 369—46 **2 Claims**

1. An apparatus for reproducing information recorded on an optical disk having a plurality of V grooves each of said V grooves being formed by two sloped surfaces, with each of the sloped surfaces forming an information track, said apparatus comprising:

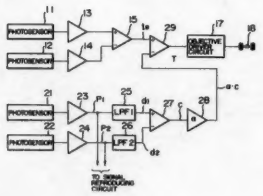
a tracking control circuit comprising:

a bisplit photosensor for detecting reflected light from a controlling laser beam projected onto one of said V grooves;

means for forming a difference of the outputs of said bisplit photosensor to produce a tracking error signal;

a pair of information reproducing photosensors for respectively receiving reflected reproduction laser light from a pair of tracks of one of said V grooves which is irradiated by a pair of reproducing laser beams, said reproducing laser beams being respectively provided at the center of two slopes forming a V groove when the controlling laser beam is positioned at the center of the same V groove;

a pair of preamplifiers respectively connected to the outputs of said pair of information reproducing photosensors for producing a pair of track information reproduction signals;



a pair of low pass filters respectively connected to outputs of said preamplifiers for extracting a low frequency component from each of said reproduction signals;

a first subtractor connected to the outputs of said filters for determining a difference in a low-frequency component of the filter outputs and for producing a correction signal;

a second subtractor for subtracting said correction signal from said tracking error signal to form a corrected tracking error signal; and

means for controlling the tracking of the reproducing laser beams in accordance with said corrected tracking error signal.

4,875,204

METHOD OF ERASING INFORMATION

Vyacheslav V. Petrov, Kiev; Nikolai V. Gorshkov, Moscow; Alexandr A. Antonov, Kiev; Alexandr P. Tokar, Kiev; Andrei A. Krjuchin, Kiev, and Semen M. Shanoilo, Kiev, all of U.S.S.R., assignors to Institut Problem Modelirovania V Energetike Akademii Nauk Ukrainskoi SSR, Kiev, U.S.S.R.

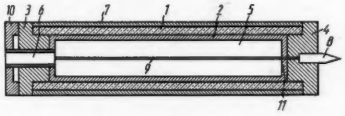
PCT No. PCT/SU87/00020, § 371 Date Oct. 6, 1987, § 102(e) Date Oct. 6, 1987, PCT Pub. No. WO87/04842, PCT Pub. Date Aug. 13, 1987

PCT Filed Feb. 5, 1987, Ser. No. 134,786

Claims priority, application U.S.S.R., Feb. 7, 1986, 3134138

Int. Cl.[4] G11B *7/00*

U.S. Cl. 369—100 **2 Claims**



1. A method for erasing information recorded on an optical information carrier having a recording layer (2) comprising the steps of exposing the optical information carrier to external action by heating said optical carrier, the optical information carrier being provided with an air-tight internal space (5) having a recording layer (2) applied to the inner surface thereof; filling said air-tight space (5) with gas inert in relation to the material of the recording layer (2) and to the material of the optical information carrier under a pressure selected from a range from 10 to 10^3 kPa; and, after the heating process is discontinued, regenerating the recording layer (2).

4,875,205

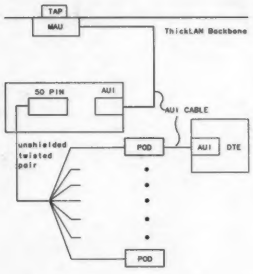
CROSSTALK REDUCTION IN UNSHIELDED TWISTED-PAIR LINES

Fred G. Huang, Folsom, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 84,960, Aug. 13, 1987, abandoned. This application Dec. 23, 1988, Ser. No. 291,375

Int. Cl.[4] H04J *15/00*

U.S. Cl. 370—6 **4 Claims**



1. In a network including a first transceiver and two or more second transceivers, each connected to said first transceiver by unshielded twisted-pair wires, said first transceiver receiving from at least one of said second transceivers a sequence of signals and retransmittting said sequence to other said second transceivers, said second transceiver transmitting said sequences at a predetermined second voltage level, said first transceiver retransmitting said sequence at a predetermined first voltage level; a method for reducing crosstalk comprising the steps:

(a) receiving by said first transceiver a sequence of signals from one of said second transceivers; and

(b) retransmitting by said first transceiver said sequence at said first voltage level, having a level different than said second voltage level.

4,875,206

HIGH BANDWIDTH INTERLEAVED BUFFER MEMORY AND CONTROL

Robert K. Nichols, Glen Ellyn, and Gary A. Roediger, Downers Grove, both of Ill., assignors to American Telephone and Telegraph Comopany, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 31, 1988, Ser. No. 175,541

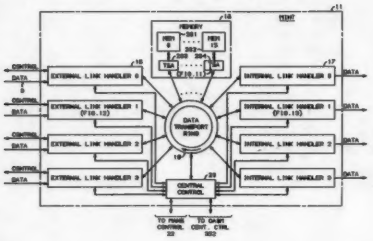
Int. Cl.[4] H04Q *11/04;* H04J *3/02*

U.S. Cl. 370—85.15 **7 Claims**

1. A method communicating between a plurality of memory modules each having a memory controller and at least one data link controller over a synchronous data ring, comprising the steps of:

assigning to each combination, of a memory controller and a data link controller, at least one time slot of said synchro-

nous data ring interconnecting said plurality of memory controllers and said at least one data link controller; and



transmitting data between a memory controller and a data link controller on the time slot assigned for that combination.

4,875,207

A DATA PROCESSING NETWORK WITH CHORDAL RING FACTOR NETWORK

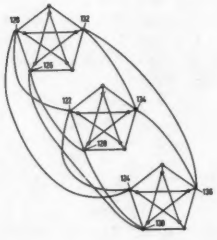
Robert A. H. Van Twist; Franciscus P. M. Hopmans, and Eddy A. M. Odijk, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 27, 1987, Ser. No. 7,155

Claims priority, application Netherlands, Jan. 30, 1986, 8600218

Int. Cl.[4] H04L *11/00*

U.S. Cl. 370—85.12 **8 Claims**



1. A data processing network of degree $G \geqq 4$ comprising:

at least 32 data processing stations, each station connected by bidirectional communications lines to a maximum of G other stations in order to exchange information;

said stations arranged as a product network of at least two factor networks;

a first one of said factor networks arranged as a chordal ring of degree 4 including at least $N \geqq 5$ of said stations and characterized by a step size S such that $2 \leqq S \leqq (N-1)/2$; and

a second one of said factor networks comprising at least two stations.

4,875,208

TRANSMISSION METHOD FOR CONTROL INFORMATION IN COMMUNICATION NETWORK

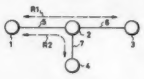
Koshi Furuhashi, Yamato; Satoshi Miyazaki, Sagamihara; Masakazu Furuya, Kawasaki; Tatsuo Kawatobi, Yokohama; Sinichi Kouyama, Hiratsuka, and Jiro Kashio, Kawasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

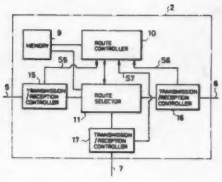
Filed Jan. 26, 1988, Ser. No. 148,532

Claims priority, application Japan, Mar. 6, 1987, 62-50029

Int. Cl.[4] H04J *3/24*

U.S. Cl. 370—94.1 **7 Claims**





1. A method for transmitting control information in a communication network having a plurality of nodes comprising:

a first step of sending out from a message source node a first control message including a destination node discriminator and a source node discriminator for establishing a communication route between a message destination node and the message source node to an information link determined in accordance with said destination node discriminator;

a second step of operating a relay node on said communication route having received said first control message to set route flag means corresponding to the communication route defined by the source node discriminator and destination node discriminator of said first control message, at a first state which indicates that the route from said source node to said relay node has been established, and to relay said first control message to an information link determined in accordance with said communication route; and

a third step of operating said relay node when said relay node detects that the condition of the information link connected to said relay node has changed, to send out a second control message for informing an adjacent node of the change in condition of said communication route detected by the relay node if said route flag means corresponding to the communication route composed partially of said information link indicates said first state.

4,875,209

TRANSIENT AND INTERMITTENT FAULT INSERTION

James K. Mathewes, Jr., Northborough; Craig A. Chancellor, Upton, and H. Frank Howes, Berlin, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Apr. 4, 1988, Ser. No. 177,286

Int. Cl.[4] G06F *11/00*

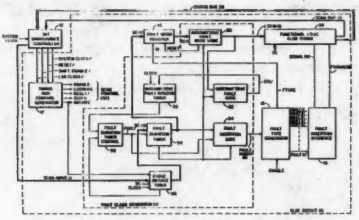
U.S. Cl. 371—3 **46 Claims**

1. In an integrated circuit having a plurality of logic arranged for internal logic states to be held in serially accessed registers which are observable and controllable, fault insertion circuitry resident in said integrated circuit comprising:

means for generating a plurality of fault classes having a first input for receiving scan path data words and a first output coupled to an input of said serially accessed registers, said

fault classes comprising a permanent fault, a transient fault and intermittent faults;

means for storing a fault word of said data words having a serial input, a serial output and a parallel output, said serial input being coupled to a second output of said fault classes generating means and said serial output being coupled to a second input of said fault classes generating means; and



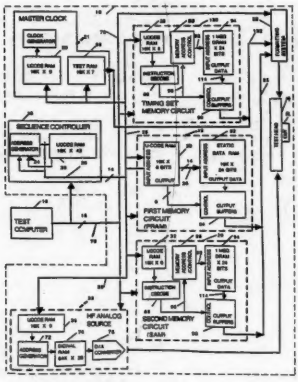
fault type generating means, coupled between said parallel output of said fault word storing means and said plurality of logic, for generating a fault type specified by said fault word for a time duration in accordance with a third output of said fault classes generating means.

4,875,210

AUTOMATIC CIRCUIT TESTER CONTROL SYSTEM

John L. Russo, Norwood, and Robert H. Van der Kloot, Medford, both of Mass., assignors to Teradyne, Inc., Boston, Mass.

Filed Jan. 6, 1988, Ser. No. 141,202
Int. Cl.[4] G01R *31/28*
U.S. Cl. 371—27 **24 Claims**



1. Apparatus for providing high speed control of digital test patterns in automatic test equipment, said apparatus comprising,

a first memory circuit including a data random access memory (RAM) storing data of nonsequential vectors, said data RAM having a first storage capacity,

a second memory circuit including a sequential data memory storing blocks of data of sequential vectors, said sequential memory having more storage capacity than said first storage capacity,

a formatter for receiving data from said data RAM or said sequential data memory and using the data to provide inputs to a circuit under test,

a sequence controller controlling said first and second memory circuits for selectively routing data from said data RAM or said sequential data memory to said formatter,

a state address bus connected to said first memory circuit, said second memory circuit and said sequence controller, and

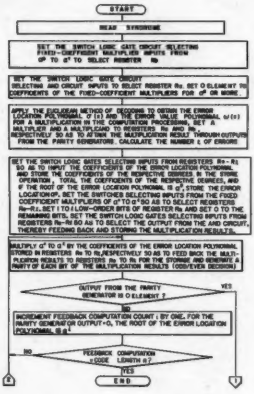
a sequence address generator, said sequence address generator providing address information to said first memory circuit, said second memory circuit and said sequence controller via said state address bus.

4,875,211

GALOIS FIELD ARITHMETIC LOGIC UNIT

Katsumi Murai, Kyoto, and Makoto Usui, Suita, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 8, 1987, Ser. No. 130,159
Claims priority, application Japan, Dec. 10, 1986, 61-294031; Jun. 18, 1987, 62-151861; Jun. 18, 1987, 62-151863
Int. Cl.[4] G06F *11/10*
U.S. Cl. 371—40.1 **26 Claims**


START
READ SYNDROME
SET THE SWITCH LOGIC GATE CIRCUIT SELECTING FIXED-COEFFICIENT MULTIPLIER INPUTS FROM α^0 TO α^r TO SELECT REGISTER Ro
SET THE SWITCH LOGIC GATE CIRCUIT SELECTING AND CIRCUIT INPUTS TO SELECT REGISTER Ro, SET 0 ELEMENT IN COEFFICIENTS OF THE FIXED-COEFFICIENT MULTIPLIERS FOR α^0 OR MORE
APPLY THE EXCLUSIVE METHOD OF DECODING TO OBTAIN THE ERROR LOCATION POLYNOMIAL σ(z) AND THE ERROR VALUE POLYNOMIAL ω(z) FOR A MULTIPLICATION IN THE COMPUTATION PROCESSING, SET A MULTIPLIER AND A MULTIPLICAND TO REGISTERS Rw AND Rx, RESPECTIVELY SO AS TO OBTAIN THE MULTIPLICATION RESULT THROUGH OUTPUTS FROM THE PARITY GENERATORS. CALCULATE THE NUMBER t OF ERRORS
SET THE SWITCH LOGIC GATES SELECTING INPUTS FROM REGISTERS Ro~Rt SO AS TO INPUT THE COEFFICIENTS OF THE ERROR LOCATION POLYNOMIAL AND STORE THE COEFFICIENTS OF THE RESPECTIVE DEGREES IN THE STORE OPERATION, TOTAL THE COEFFICIENTS OF THE RESPECTIVE DEGREES, AND IF THE ROOT OF THE ERROR LOCATION POLYNOMIAL IS α^i, STORE THE ERROR LOCATION=i/P, SET THE SWITCHES SELECTING INPUTS FROM THE FIXED COEFFICIENT MULTIPLIERS OF α^0 TO α^t SO AS TO SELECT REGISTERS Ro~Rt, SET 1 TO LOW-ORDER BITS OF REGISTER Rx AND SET 0 TO THE REMAINING BITS, SET THE SWITCH LOGIC GATES SELECTING INPUTS FROM REGISTERS Ro~Rt SO AS TO SELECT THE OUTPUT FROM THE AND CIRCUIT, THEREBY FEEDING BACK AND STORING THE MULTIPLICATION RESULTS
MULTIPLY σ^0 TO σ^t BY THE COEFFICIENTS OF THE ERROR LOCATION POLYNOMIAL STORED IN REGISTERS Ro TO Rt, RESPECTIVELY SO AS TO FEED BACK THE MULTIPLICATION RESULTS TO REGISTERS Ro TO Rt, TO PERFORM THE STORING AND REWRITE A PARITY OF EACH BIT OF THE MULTIPLICATION RESULTS (ODD/EVEN DECISION)
OUTPUT FROM THE PARITY GENERATOR IS 0 ELEMENT ?
YES
NO
INCREMENT FEEDBACK COMPUTATION COUNT i BY ONE. FOR THE PARITY GENERATOR OUTPUT=0, THE ROOT OF THE ERROR LOCATION POLYNOMIAL IS α^i
NO
FEEDBACK COMPUTATION CODE LENGTH n ?
YES
END

1. A Galois field arithmetic logic unit comprising:

a group of memory elements having first storing means for storing a coefficient value of each degree of an error location polynomial with a maximum degree of t for Reed-Solomon codes of which each code word includes elements of a Galois field GF (2^r) and for storing values of intermediate computation results associated with at least (t+1) symbols for each degree obtained through substitution of location values to said error location polynomial;

means for storing said coefficient values in said memory elements;

a group of fixed coefficient multipliers including r multipliers for multiplying in a common fashion an arbitrary first 1-symbol input by powers of a primitive element α of said Galois field GF (2^r) ranging from a power of 0 thereof to a power of (r−1) thereof, namely, by r fixed coefficients from α^0 to α^{r-1} or for multiplying the values stored in said group of memory elements of (t+1) symbols of which the number is equal to at most r by fixed coefficients from α^0 to α^t;

first means for changing over said r fixed coefficients ranging from α^0 to α^{r-1} to said fixed coefficients of the 0 element in said Galois field GF (2^r) in association with bits ranging from 0-th bit relative to a least-significant bit to an (r−1)-th bit respectively of an arbitrary second 1-symbol input in a binary representation;

means for supplying inputs of said r multipliers with results of a change-over selection effected on inputs thereto

including said arbitrary first symbol and values of outputs from said group of memory elements;

a group of r odd/even decision means for attaining an Exclusive-OR for each component of a binary vector of r symbols obtained as results from said r multipliers so as to obtain a 1-symbol results;

means for detecting whether or not the symbol outputted from said group of odd/even decision means is a 0 element; and

means for feeding back the (t+1) symbols produced from said r multipliers to said group of memory elements so as to store said symbols therein.

4,875,212

MEMORY DEVICE WITH INTEGRATED ERROR DETECTION AND CORRECTION

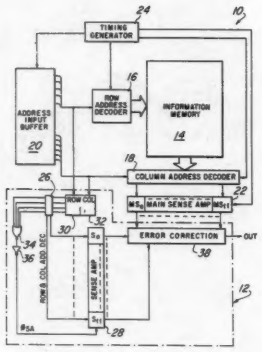
Masashi Hashimoto, Miho, Japan, assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 912,027, Sep. 25, 1986, abandoned. This application Feb. 13, 1989, Ser. No. 310,496

Claims priority, application Japan, Oct. 8, 1985, 60-225739

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—40.2 **6 Claims**



1. A semiconductor memory device comprising:

a first memory array having stored therein a plurality of data words each comprising a predetermined number of information bits;

an integrated error detection and correction circuit including a second memory array having stored therein a plurality of bits generated in accordance with a predefined error detect/correct code, the second memory array being programmable to create error detection and correction data on the basis of which bits in error in said first memory array are to be detected and corrected,

information detecting circuitry associated with said first memory array to detect information bits red from said first memory array, the information detecting circuitry comprising a plurality of information detecting units, said plurality being equal in number to the predetermined number of information bits,

error detecting circuitry associated with said second memory array to detect each error bit read from said first memory array and provided by said information detecting circuitry, the error detecting circuitry comprising a plurality of error detection and correction data detecting units, the plurality of error detection and correction data detecting units being equal in number to said plurality of information detecting units and each unit being operative to produce an error signal in response to an erroneous information bit read from said first memory array through said information detecting circuitry, and

an error correction circuit operatively intervening between said information detecting circuitry and said error detection and correction data detecting units to invert the logic state of each erroneous information bit read from said first memory array through said information detecting circuitry.

4,875,213

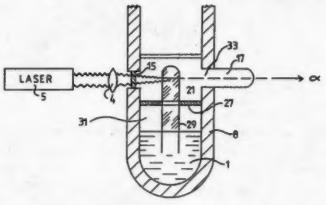
METHOD AND APPARATUS FOR GENERATING COHERENT BOSONS

Shui-Yin Lo, Sherman Oaks, Calif., assignor to Apricot S.A., Luxembourg, Luxembourg

Filed Oct. 23, 1987, Ser. No. 112,842

Int. Cl.[4] H01S *3/30*

U.S. Cl. 372—5 **38 Claims**



1. The method of producing a coherent boson beam having mass, comprising the steps of:

providing matter comprised of bosons, said matter having a density and temperature such that some of said bosons are at their lowest energy levels; and

causing coherent light to be incident on said bosons such that a coherent boson beam having mass is produced, said beam having spatial temporal coherence.

4,875,214

X-RAY LASER

William Denne, The Lane House, 10B Church St., Great Shelford, England

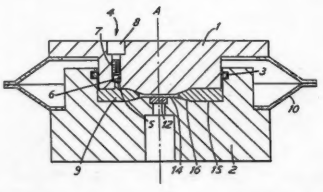
PCT No. PCT/GB86/00480, § 371 Date Jun. 2, 1987, § 102(e) Date Jun. 2, 1987, PCT Pub. No. WO87/00981, PCT Pub. Date Feb. 12, 1987

PCT Filed Aug. 8, 1986, Ser. No. 40,773

Claims priority, application United Kingdom, Aug. 8, 1985, 8519878

Int. Cl.[4] H01S *3/30*

U.S. Cl. 372—5 **10 Claims**



1. An X-ray laser comprising a rigid structure confining a substantially incompressible fluent medium, said medium surrounding a substantially cylindrical cavity of residual vapour of said medium, said rigid structure including spaced rigid surfaces intersected by an axis of the cylindrical cavity and constraining the fluent medium therebetween, means for causing violent collapse of the cavity to form an extremely hot dense plasma of said medium along said axis, the formation of said plasma causing intense thermal X-ray emission, said emission pumping energy into said medium to effect an X-ray inversion within an elongated volume along said axis, said

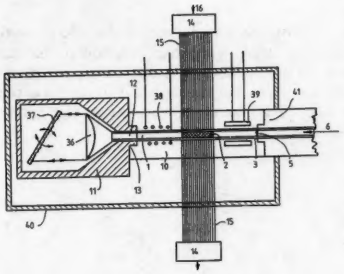
X-ray inversion causing super-radiant x-ray emission along said axis.

4,875,215

FIBRE COMMUNICATION LASER SYSTEM

John L. Hughes, Melbourne, Australia, assignor to Australian Electro Optics Pty. Ltd., Melbourne, Australia

Filed Aug. 12, 1988, Ser. No. 231,512
Int. Cl.[4] H01S 3/30
U.S. Cl. 372—6 **10 Claims**



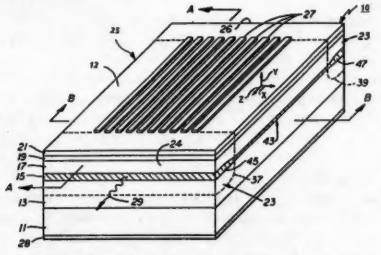
1. A modular optical communications system interconnecting, sectionally doped, laser oscillator and laser amplifier modules, said laser oscillator module consisting of a short length of single mode optical fibre optically polished at both ends, on which are laser beam reflectors, and sectionally doped with lasing ions which are optically excited said fibre length being embedded in a moulded sheath whilst the said amplifier module comprising a complete long-haul section of optical fibre cable with the core of the optical fibre within said cable being doped in sections along the cable to form a series of laser repeaters which are optically excited said cable having two or more optical fibre links embedded in a moulded, transparent sheath, itself sheathed for long life protection from its environment.

4,875,216

BURIED WAVEGUIDE WINDOW REGIONS FOR IMPROVED PERFORMANCE SEMICONDUCTOR LASERS AND OTHER OPTO-ELECTRONIC APPLICATIONS

Robert L. Thornton, East Palo Alto, Calif., and Robert D. Burnham, Wheaton, Ill., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 30, 1987, Ser. No. 126,546
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—45 **6 Claims**



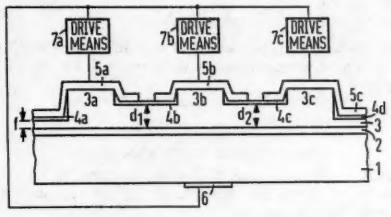
1. In a buried planar passive waveguide structure formed in a plurality of semiconductor heterostructure layers, one of said layers within said structure having a lower energy bandgap than layers immediately adjacent thereto, said structure comprising a transparent single mode waveguide in said one layer formed by impurity induced disordering in combination with said immediately adjacent layers creating a longitudinal waveguide along at least a portion of said one layer having the highest refractive index at its core with diminishing refractive index from its core into adjacent layers.

4,875,217

LASER DIODE ARRAY WITH LATERAL COUPLING

Franz Kappeler, Puchheim; Thomas Wolf, Munich, and Bernhard Stegmueller, Augsburg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed May 20, 1988, Ser. No. 196,387
Claims priority, application Fed. Rep. of Germany, May 22, 1987, 3717383
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—50 **11 Claims**



1. A laser diode array in a component for lateral coupling of laser emissions, comprising:

a substrate of doped semiconductor material of a first conductive type;

an active layer on said substrate and means for providing a resonant cavity in said active layer and operable to generate a laser emission;

a cover layer of doped semiconductor material of a second conductive type over said active layer,

at least two ridges formed in said cover layer, said at least two ridges being allocated to corresponding laser stripes of said array, said cover layer being of a thickness in a region between two adjacent ones of said ridges so that a lateral coupling of said laser stripes occurs;

oxide layers on said cover layer in regions between outer upper edges of outer ones of said at least two ridges and edges of said component;

a contact on each of at least two ridges, said contacts being separate from one another between said ridges to enable said laser stripes to be separately driven;

a cooperating contact on a free surface of said substrate; and

said component having a layer structure outside a region occupied by said at least two ridges and their interspaces so that a wave guidance effect occurs at sides of said array.

4,875,218

THIN-FILM COATED WAVEGUIDE LASER

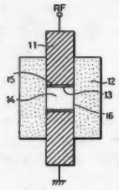
Akihito Hongo; Tsuneo Shiota, both of Ibaraki; Shigeo Nishida, Miyagi; Mitsunobu Miyagi, Miyagi, and Yoshihiko Wagatsuma, Miyagi, all of Japan, assignors to Hitachi Cable Ltd., Tokyo, Japan

Filed Mar. 7, 1986, Ser. No. 837,120
Claims priority, application Japan, May 29, 1985, 60-115837; Nov. 21, 1985, 60-262270
Int. Cl.[4] H01S 3/03, 3/097
U.S. Cl. 372—64 **11 Claims**

1. A waveguide laser having a hollow waveguide defined by opposing metal electrodes and dielectric or lossy materials insulating said metal electrodes from each other, wherein the improvement comprises:

thin first films provided on opposed surfaces of said metal electrodes, said thin first films being made of a material

whose absorption loss at an oscillation wavelength of said



laser is low, wherein a thickness t of said thin films satisfies:

$$t \simeq \frac{\lambda q}{4\sqrt{n_f^2 - 1}}$$

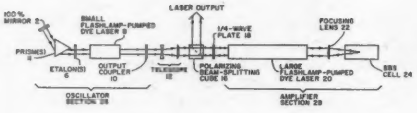
where n_f is a refractive index of said thin first film, λ is an oscillation wavelength of said laser, and q is an odd positive integer.

4,875,219

PHASE-CONJUGATE RESONATOR

Stephen D. Russell, Starkville, Miss., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 28, 1988, Ser. No. 276,981
Int. Cl.[4] H01S *3/30, 3/23*
U.S. Cl. 372—92 **6 Claims**



1. A phase-conjugate resonator, comprising: an oscillator for generating and oscillating light, said oscillator having a partially reflective outcoupler for transmitting a part of said light; an amplifier for receiving transmitted light from said oscillator outcoupler, said amplifier having a stimulated Brillouin Scattering cell to function as a phase conjugate mirror; a beam expansion means between said oscillator and said amplifier; combination of a polarizing beam splitting cube and a $\frac{1}{4}$-wave plate between said beam expansion means and said amplifier for transmitting said light from said expansion means to said amplifier, for outcoupling useful light output from said resonator, and for directing a portion of light from said amplifier back to said oscillator as feedback; and said oscillator further comprising a first flashlamp-pumped dye laser for generating and amplifying light, a reflecting mirror to reflect said light, and means for polarizing and selectively adjusting linewidth of said light.

4,875,220

LASER TUBE FOR POLARIZED LASER EMISSION

Hans Krueger, Munich, and Wolfgang Welsch, Baldham, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

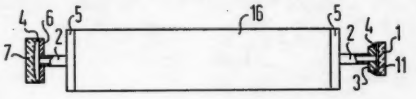
Filed Nov. 2, 1988, Ser. No. 265,923
Claims priority, application Fed. Rep. of Germany, Nov. 5, 1987, 3737624
Int. Cl.[4] H01S *3/08, 3/22, 3/03*
U.S. Cl. 372—107 **19 Claims**

1. In a laser tube for use in a laser, the improvement comprising:

two laser mirrors;

means for integrally connecting said laser mirrors to a laser tube to form a housing, said connecting means including a metal flange connecting one of said mirrors to said laser tube; and

at least one means for polarizing said laser emission, said polarizing means comprising at least one polarizing layer



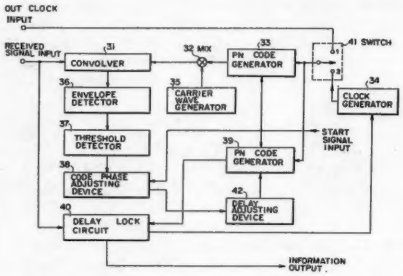
arranged on one of said laser mirrors, said polarizing layer being produced by oblique evaporation and serving as both a reflective layer and a polarizing layer, on said one laser mirror, said oblique evaporation being carried out at an angle of at least 80 degrees to a surface normal of said mirror to produce said surface.

4,875,221

SPREAD SPECTRUM RECEIVER

Masaharu Mori, Tokyo, Japan, assignor to Clarion Co., Ltd., Tokyo, Japan

Filed Oct. 9, 1987, Ser. No. 107,373
Claims priority, application Japan, Oct. 14, 1986, 61-243595
Int. Cl.[4] H04K *1/00*
U.S. Cl. 375—1 **14 Claims**



1. A spread spectrum receiver, comprising:

code generator means for generating a reference pseudo noise code and a further pseudo noise code;

first correlating means which includes a convolver for producing a first correlation output signal in response to said reference pseudo noise code and a received signal containing pseudo noise;

second correlating means for producing a second correlation output signal in response to said received signal and said further pseudo noise code and for synchronizing the phase of a clock used to produce said further pseudo noise code with the phase of a clock used to produce said pseudo noise contained in said received signal;

code phase adjuster means for generating an output signal which causes said code generator means to adjust the phase of said further pseudo noise code by an amount which is a function of a time interval from the start of said reference pseudo noise code to said first correlation output signal; and

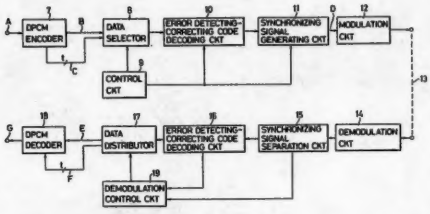
delay adjuster means for delaying said output signal of said code phase adjuster means by a time delay which is adjustable.

4,875,222

INFORMATION SIGNAL TRANSMISSION SYSTEM BY PREDICTIVE DIFFERENTIAL CODING

Motokazu Kashida, Tokyo, and Toshiyuki Masui, Kanagawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 745,307, Jun. 14, 1985, abandoned.
This application Oct. 15, 1986, Ser. No. 919,545
Claims priority, application Japan, Jun. 28, 1984, 59-133909; Jun. 28, 1984, 59-133910
Int. Cl.[4] H04B *14/06*
U.S. Cl. 375—26 20 Claims



1. An information signal transmission system by predictive differential coding, comprising:

(a) predictive differential coding means arranged to receive information codes according to digital values of the information signal, and arranged to produce difference codes according to differential values between the information codes and predictive codes for the information codes, said predictive differential coding means producing each of the difference codes by using a "k" number, where ($k \geqq 2$), of the information codes;

(b) code sequence forming means for forming a code sequence which includes a plurality of code groups each of which includes an "m" number, where ($m \geqq k$), of the difference codes and the "k" number of the information codes used for producing one of the "m" number of the difference codes; and

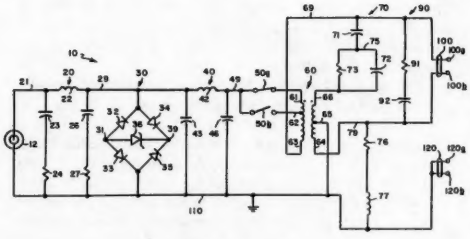
(c) transmission means for transmitting said code sequence.

4,875,223

TWISTED PAIR ADAPTER

Robert A. Curtis, Marlboro, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Sep. 8, 1987, Ser. No. 93,974
Int. Cl.[4] H04B *3/00*; H04L *25/00*
U.S. Cl. 375—36 18 Claims



1. An adapter for enabling high frequency data signals to be transmitted over a twisted pair cable, the adapter having first and second adapter terminals, and third and fourth adapter terminals, the adapter comprising:

A. a network, for blocking passage of low-frequency, direct current (DC) components of the data signals, and for passing high-frequency, alternating current (AC) components of the data signals; and

B. a transformer, having

(i) a primary winding with upper and lower terminals, the upper primary terminal connected to the first adapter terminal, the lower primary terminal connected to the third adapter terminal, the primary winding providing a path for the low frequency, direct current (DC) components of the data signals between the first and third adapter terminals; and

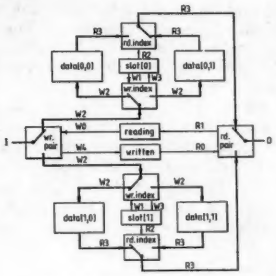
(ii) a secondary winding with an intermediate tap forming upper and lower windings, and providing in-phase and opposite-phase high frequency alternating current (AC) components of the data signals at upper and lower secondary terminals, respectively, the intermediate tap connected to the second adapter terminal, the upper secondary terminal coupled to the third adapter terminal through the network, to pass the in-phase AC components between the upper secondary terminal and the third adapter terminal, and to block passage of the DC components via the secondary winding to the fourth adapter terminal, and the lower secondary terminal connected to the fourth adapter terminal, to pass the opposite-phase AC components between the lower secondary terminal and the fourth adapter terminal.

4,875,224

ASYNCHRONOUS COMMUNICATION SYSTEMS

Hugo R. Simpson, Stevenage, England, assignor to British Aerospace plc, London, England

Filed May 18, 1988, Ser. No. 195,247
Claims priority, application United Kingdom, May 21, 1987, 8711991
Int. Cl.[4] H04L *25/36*
U.S. Cl. 375—118 13 Claims



6. In an asynchronous communication system comprising memory means, slot means formed in said memory means, data writing means, an input operatively connected to said data writing means, data reading means, and an output operatively connected to said data reading means,

the improvement wherein said slot means comprise a first and second pairs of slots,

said data writing means include write pair selector means adapted to select one of said first and second pairs of slots and first and second write slot selector means operatively connected to said write pair selector means and adapted to select one slot of a respective pair of slots, and

said data reading means include read pair selector means adapted to select one of said first and second pairs of slots and first and second read slot selector means operatively connected to said read pair selector means and adapted to select one slot of a respective pair of slots, said system being adapted to transmit asynchronously fresh coherent data from said input to said output via said memory means.

4,875,225

X-RAY VIDEO SYSTEM AND METHOD FOR THE TRANSILLUMINATION OF AN EXAMINATION SUBJECT

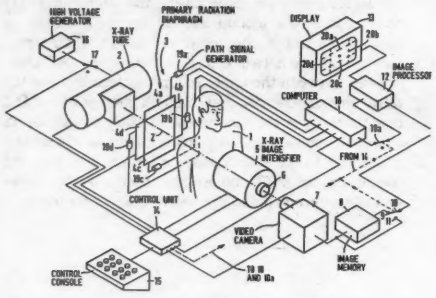
Michael Hunold, Ottweiler, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Feb. 1, 1988, Ser. No. 150,846

Claims priority, application Fed. Rep. of Germany, Feb. 16, 1987, 3704859

Int. Cl.[4] A61B 6/06

U.S. Cl. 378—99 **13 Claims**



1. An x-ray diagnostic system for examining a patient comprising:

means for generating a transillumination image of said patient using an x-ray beam having a central ray;

means for storing said transillumination image;

diaphragm means for gating said x-ray beam having a plurality of diaphragm plates each moveable relative to said central ray;

means for generating a signal corresponding to the position of a diaphragm plate in said plurality of diaphragm plates relative to said central ray;

means for visually displaying the stored transillumination image; and

means for generating a mark corresponding to the said diaphragm plate from said signal and for mixing said mark into said stored transillumination image at a location in said stored transillumination image corresponding to the position of said diaphragm plate for simultaneous visual display with said stored transillumination image on said means for displaying.

4,875,226

X-RAY MACHINE

Donald B. Plewes, Rochester, N.Y., assignor to University of Rochester, Rochester, N.Y.

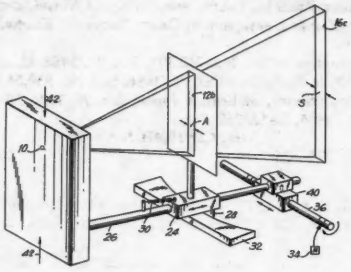
Filed Apr. 21, 1988, Ser. No. 184,210

Int. Cl.[4] G21K 5/10

U.S. Cl. 378—146 **10 Claims**

7. A method comprising:

scanning an object position with a scanning x-ray beam; and varying the cross-section of said scanning x-ray beam during the scan to keep substantially constant the beam footprint



on an image plane which receives said beam after said beam passes through said object position.

4,875,227

ANTI-SCATTER GRID SYSTEM

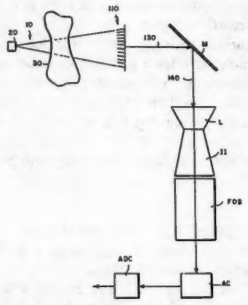
Remo J. Rossi, and John Grady, both of 300 Foster St., Litteton, Mass. 01460

Continuation of Ser. No. 805,870, Dec. 6, 1986. This application Sep. 30, 1988, Ser. No. 252,380

The portion of the term of this patent subsequent to May 9, 2006, has been disclaimed.

Int. Cl.[4] G21K 1/00

U.S. Cl. 378—154 **14 Claims**



8. A method of reconstructing a primary X-ray image of a subject which partially absorbs and partially transmits scattered and unscattered X-ray photons, comprising the steps of:

projecting a beam of X-ray photons at and through the subject to be examined;

aligning an X-ray photon sensitive detector behind the subject to detect the X-ray photons transmitted through the subject;

filtering the scattered X-ray photons transmitted through the subject with a grid means disposed between the subject and the detector, the grid means including filtration strips having a strip density of between one and three strips per inch and a strip height of between one and five inches and obstructing less than about fourteen percent of the unscattered X-ray photons transmitted through the subject from reaching the detector;

recording an analog image of the subject from the X-ray photons detected by the detector, the image recorded from photons transmitted through the subject and the grid means and to the detector;

converting the analog image to a digital array of data representative of the analog image; and

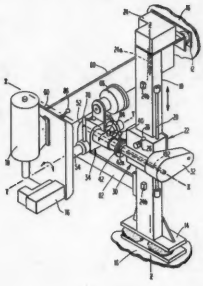
reconstructing the image into a complete image of unscattered photons as if unobstructed by the grid means.

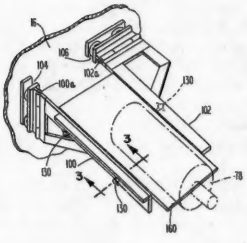
4,875,228

X-RAY GANTRY

David Archer, Ontario, Canada, assignor to Davru Manufacturing Ltd., Mallorytown, Canada

Filed Jul. 12, 1988, Ser. No. 218,157
Int. Cl.[4] G01N *23/18*; G62D *39/00*
U.S. Cl. 378—197 20 Claims





1. A gantry apparatus for positively supporting an x-ray device while permitting adjustment of the position of the device with respect to a patient to be examined, comprising:

a standard fixed with respect to a mounting structure, and defining a path of movement along a first z-axis;

a first carriage means, movable with respect to said standard along said z-axis, and lockable to said standard;

a horizontal arm, fixed to said first carriage means and defining a second path of movement along a second x-axis orthogonal to said first z-axis;

second carriage means, movable with respect to said standard along said x-axis, and defining a third transverse y-axis of motion orthogonal to said x- and z-axes;

a transverse arm, mounted to said second carriage means and extending along said y-axis;

a support plate means mounted to said transverse arm for movement along said y-axis and comprising means for supporting the x-ray device; and

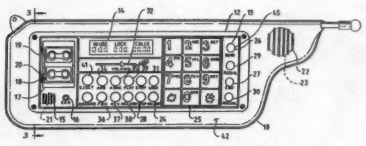
caging arm means comprising plural caging arms extending from plural points fixed with respect to said mounting structure to said support plate means, said caging arm means being releasably lockable to said support plate means while said support plate means is in a defined home position.

4,875,229

VEHICLE TELEPHONE WITH CALL ANSWERING AND RECORDING MEANS

Anthony P. Palett, Farmington Hills, Mich., and A. Gil Spear Jr., Vero Beach, Fla., assignors to Anthony P. Palett, Farmington Hills, Mich.

Filed Jan. 11, 1989, Ser. No. 295,958
Int. Cl.[4] H04M *1/02*
U.S. Cl. 379—58 8 Claims



1. A unitary vehicle sun visor and telephone apparatus with telephone call answering and recording means adapted to be operated by an occupant of a motor vehicle, said unitary apparatus being positioned ahead of the occupant and having a panel with first and second oppositely disposed faces mounted for rotation about an axis, said panel being selectively adjustable to a position whereat said first surface is in confronting relationship to said occupant for shading the occupant and to another position whereat said first surface is in concealed relationship to said occupant; telephone means mounted in said panel for transmitting and receiving messages to and from said occupant; telephone answering means mounted in said panel and cooperating with said telephone means to answer telephone calls when the vehicle is unoccupied; recording means mounted in said panel and cooperating with said telephone means to record incoming telephone messages when said vehicle is occupied or unoccupied; a face plate mounted on one of said surfaces of said panel; and controls mounted in said face plate for operating said telephone and said call answering and recording means.

4,875,230

CELLULAR TELEPHONE UNIT HAVING MULTIPLE MEMORY LOCATION COMMAND LANGUAGE

Kevin B. Blair, Spring, Tex., assignor to GTE Mobilnet Incorporated, Houston, Tex.

Filed Jul. 25, 1988, Ser. No. 223,864
Int. Cl.[4] H04Q *7/04*
U.S. Cl. 379—63 4 Claims

1. A cellular telephone unit comprising:

an addressable memory having one or more memory locations;

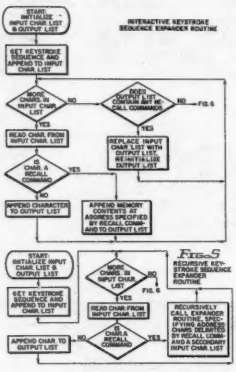
a keypad on which keystrokes can be entered;

memory addressing circuitry, connected to said keypad and to said memory, for selectively storing one or more keystrokes as the contents of a specified said memory location in response to a STORE keystroke command sequence entered on said keypad;

recognition circuitry for recognizing zero or more subsequences of keystrokes, within a keystroke sequence comprising one or more keystrokes entered on said keypad, as recall commands, each said recall command specifying a corresponding said memory location;

expansion circuitry for expanding each said recall command by substituting the keystroke contents of the correspond-

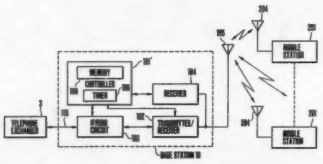
ing said memory location into said keystroke sequence in place of the recall command, repeatedly until said keystroke sequence comprises a final expanded keystroke sequence containing no recall commands.



4,875,231
RADIO TELEPHONE SYSTEM

Toshihiro Hara; Akio Yotsutani; Ryoji Kawasaki, all of Tokyo; Kazuyuki Tate, Aichi; Syoji Huse, and Koji Ono, both of Tokyo, all of Japan, assignors to NEC Corporation; Nippon Telegraph & Telephone Corp., both of Tokyo and Kabushiki Kaisha Toshiba, Kanagawa, all of, Japan

Filed Oct. 27, 1987, Ser. No. 112,928
Claims priority, application Japan, Oct. 30, 1986, 61-258748
Int. Cl.[4] H04M *11/00*
U.S. Cl. 379—61 **5 Claims**

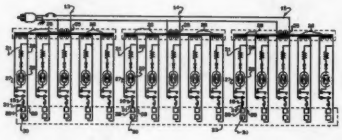


1. A multi-access radio telephone system having
a base station connected to a telephone exchanger and
a plurality of mobile stations connected to said base station through radio channels including a control channel and a predetermined number of communication channels,
said base station comprising:
a transmitter/receiver for receiving a control signal through said control channel and for transmitting/receiving a communication signal through a given one of the predetermined number of communication channels;
a receiver for receiving a communication signal through a given one of the predetermined number of communication channels to detect a vacant one of the predetermined number of communication channels and for receiving the control signal to monitor a calling signal received from a given one of said plurality of mobile stations through the control channel, respectively; and
control means for performing connection control and communication control
such that, in a first mode, said receiver receives the communications signal to detect a vacant communication channel while said transmitter/receiver receives the control signal to monitor the calling signal transmitted from said given mobile station through the control channel, and in a second mode, said receiver receives the control signal to monitor a calling signal while said transmitter/receiver is busy communicating with said mobile station.

4,875,232
TELEPHONE POWER DISTRIBUTION AND ISOLATION SYSTEM

Mark P. Shumway, 230 W. 2950 South, Salt Lake City, Utah 84115

Filed Jun. 30, 1988, Ser. No. 213,910
Int. Cl.[4] H04M *19/08*
U.S. Cl. 379—413 **1 Claim**



1. A telephone power isolation system comprising
a housing having a top face;
at least one transformer having an AC input winding and a plurality of output windings, each said transformer extending through the top face;
a telephone connector having a two pin pair extending through the top face;
electrical connector means including a fuse connecting one side of each output winding to one pin receptacle of said two pin pair and each said face extending through the top face;
electrical connector means connecting the other end of each output winding to the other pin receptacle of the two pin pair;
an LED adjacent each fuse, with each said LED being electrically connected to the electrical connector means connecting the other end of each output winding to the other pin receptacle and arranged to turn on upon breaking of the circuit through said adjacent fuse and extending through the top face;
means carried by the top face to releasably secure a cable connected to the telephone pin connector, and means including a pair of adjustably interconnectable flexible straps; and
each of said transformers and its associated fuses and LED's being group together through the top face and independently grouped from each other transformer and its associated fuses and LED's.

4,875,233
HEADSET CONSTRUCTION AND METHOD OF MAKING SAME

Robert L. Derhaag, 1364 Calle Crucero, San Marcos, Calif. 92069, and David B. Rose, 1827 Drescher St., San Diego, Calif. 92111

Filed Oct. 16, 1987, Ser. No. 109,460
Int. Cl.[4] H04M *1/05*
U.S. Cl. 379—430 **26 Claims**

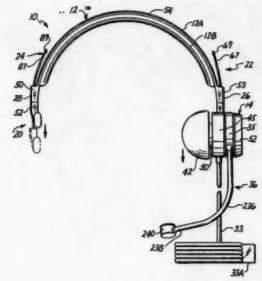
1. A headset for fitting and engaging a user's crown and temple, for positioning a speaker opposite the user's ear, and for retaining a microphone in front of the user's mouth, comprising:
an arcuate headband for fitting and overlying the user's crown, said headband being composed of a thermoplastic rubber material;

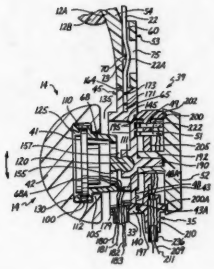
an earpiece assembly being secured to one end of said headband for engaging the user's ear;

a temple piece being secured to the opposed end of said headband for engaging the user's temple;

means for positioning the microphone selectively in front of the user's mouth;

said headband having an integral unitary molded structure, and including an inner soft member for engaging the user's crown, and an outer resilient member for rigidifying said inner soft member, and preventing breakage or malfunctioning of said headband; and





said earpiece assembly including an earmuff for engaging the user's ear, a speaker holder for retaining the speaker adjustably against the user's ear, a speaker interface module connected rotatably to said speaker holder, and which is further connected adjustably to said headband, and a microphone interface module connected rotatively to said speaker interface module, and a slip ring connector for providing continuous electrical contact between said speaker interface module, and said microphone interface module.

4,875,234

TELEPHONE

Joerg Tragatschnig, Zell am See-Thumersbach, Austria, assignor to Porsche Design GmbH, Zell am See, Austria

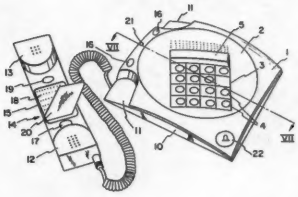
Filed Jan. 8, 1987, Ser. No. 1,288

Claims priority, application Fed. Rep. of Germany, Jan. 14, 1986, 3600835

The portion of the term of this patent subsequent to Nov. 10, 2004, has been disclaimed.

Int. Cl.[4] H04M *1/23*

U.S. Cl. 379—434 **3 Claims**



1. A telephone comprising a housing having a rectangular bottom surface, vertically extending lateral walls, and a cover surface, a circular panel portion pivotally mounted on said cover surface, and a key block mounted on said panel portion, said cover surface of said housing, said panel portion, and said key block being contoured to substantially form a segment of a sphere; a telephone handset having an earpiece and a mouthpiece and a middle portion connecting said earpiece and said mouthpiece, said middle portion of said handset having an inner surface and including a hinged cover provided with a phone number register on the inner side thereof, said cover surface having synclinal depressions in two neighboring corners thereof for respectively receiving said earpiece and said mouthpiece of said handset on resting of said handset on said housing; said middle portion of said handset being spherically curved so that the inside surface thereof rests against said cover surface of said housing when said handset is disposed therein with said earpiece and said mouthpiece thereof respectively received in said synclinal depressions.

DESIGN PATENTS

GRANTED OCT. 17, 1989

ERRATA

For CLASS	See PATENT NO.
D08-001	304,086
D28-054	304,101

DESIGNS

OCTOBER 17, 1989

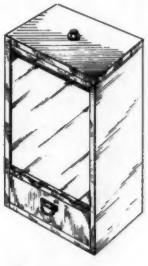
303,995
NURSING SHAWL
Rodger S. Dameron, 2408 Maxwell, Midland, Tex. 79705
Filed Mar. 7, 1987, Ser. No. 46,864
Term of patent 14 years
U.S. Cl. D2—225

303,996
SHOE SOLE
Craig L. Feller, Tigard, Oreg., assignor to Avia Group International, Inc., Portland, Oreg.
Filed Feb. 1, 1989, Ser. No. 304,833
Term of patent 14 years
U.S. Cl. D2—320

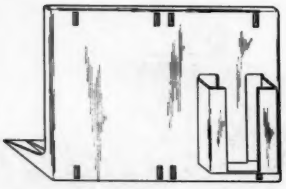
303,997
KEY-RING
Claude Grossiord, Annecy, France, assignor to S. T. Dupont, Paris Cedex, France
Filed Jun. 4, 1986, Ser. No. 870,687
Claims priority, application France, Dec. 19, 1985, 856074
Term of patent 14 years
U.S. Cl. D3—61

303,998
CARRYING CASE
Sydney V. Davis, Neponset, N.Y., assignor to Ve-Alite Plastic Corporation, Brooklyn, N.Y.
Filed Jul. 25, 1986, Ser. No. 889,361
Term of patent 14 years
U.S. Cl. D3—73

303,999
COMBINED EARRING DISPLAY AND STORAGE CASE
Maria Hansson, 331 Joan St., Ronkonkoma, N.Y. 11779
Division of Ser. No. 195,432, May 16, 1988, which is a continuation of Ser. No. 892,385, Jul. 31, 1986. This application Sep. 7, 1988, Ser. No. 241,545
Term of patent 14 years
U.S. Cl. D3—75

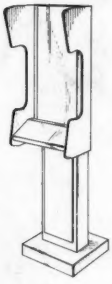


304,000
DISPLAY STAND FOR LITERATURE
Terry A. Turbeville, 440 S. 5th St., Louisville, Ky. 40202
Filed Aug. 1, 1986, Ser. No. 892,094
Term of patent 14 years
U.S. Cl. D6—310



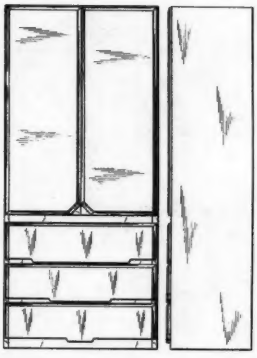
304,001
ARMCHAIR
Raymond Grosfillex, Arbent, 01107 Oyonnax, France
Filed Jul. 23, 1986, Ser. No. 888,420
Claims priority, application France, Jan. 24, 1986, 86 860,343
The portion of the term of this patent subsequent to Apr. 4, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—379

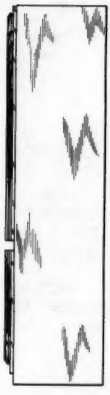
304,002
TELEPHONE ENCLOSURE
John W. Nichols, and Stevens Van Pinkerton, Jr., both of St. Joseph, Mo., assignors to Acoustics Development Corporation, St. Joseph, Mo.
Filed Jul. 14, 1987, Ser. No. 73,417
Term of patent 14 years
U.S. Cl. D6—421



304,003
ARMOIRE
Albert Azzolina, 4 Catalpa La., Valley Stream, N.Y. 11581
Filed May 28, 1987, Ser. No. 55,741
Term of patent 14 years
U.S. Cl. D6—446

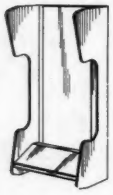
304,004
ARMOIRE
Albert Azzolina, 4 Catalpa La., Valley Stream, N.Y. 11581
Filed May 28, 1987, Ser. No. 55,767
Term of patent 14 years
U.S. Cl. D6—446



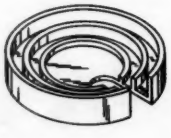


304,005
TABLE LEG
Mary J. Reid, Sheboygan, Wis., assignor to Kohler Co., Kohler, Wis.
Filed Jan. 13, 1987, Ser. No. 2,912
Term of patent 14 years
U.S. Cl. D6—497

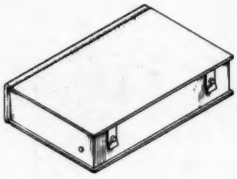
304,006
TELEPHONE ENCLOSURE
John W. Nichols, and Stevens Van Pinkerton, Jr., both of St. Joseph, Mo., assignors to Acoustics Development Corporation, St. Joseph, Mo.
Filed Jul. 15, 1987, Ser. No. 73,426
Term of patent 14 years
U.S. Cl. D6—553

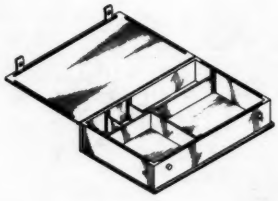


304,007
CUP HOLDER WITH SLOT FOR CUP HANDLE
John R. Davis, c/o Don Compton, 3 Laquinta Ct., Pace, Fla. 32571
Filed Jun. 12, 1987, Ser. No. 60,843
Term of patent 14 years
U.S. Cl. D7—70

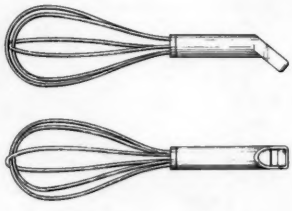


304,008
LUNCH BOX
John Hornung, 1231 Farrington Dr., La Habra, Calif. 90631
Continuation-in-part of Ser. No. 132,104, Dec. 14, 1987, abandoned, which is a continuation-in-part of Ser. No. 893,795, Aug. 6, 1986, abandoned. This application Oct. 19, 1988, Ser. No. 259,630
Term of patent 14 years
U.S. Cl. D7—76





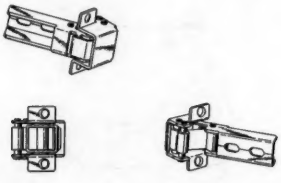
304,009
WHISK FOR THE PREPARATION OF CAKES, PIES AND THE LIKE
Bruno Gecchelin, Milan, Italy, assignor to Fratelli Guzzini S.p.A., Recanati, Italy
Filed Nov. 19, 1986, Ser. No. 932,900
Claims priority, application Italy, May 23, 1986, 21970/86[U]
Term of patent 14 years
U.S. Cl. D7—103



304,010
BARBEQUE GRILL
Tsai G. Chuan, P.O. Box 705, Taipei, Taiwan
Filed Apr. 24, 1986, Ser. No. 857,599
Term of patent 14 years
U.S. Cl. D7—332

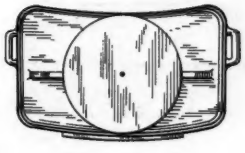
304,011
HEAT GUN
Joseph A. Seraphin, and James E. Talbot, both of Springfield, Pa., assignors to Film Applicators of North America, Springfield, Pa.
Filed Aug. 15, 1986, Ser. No. 896,984
Term of patent 14 years
U.S. Cl. D8—29.1

304,012
HINGE
Yoshinori Masuda, Tokyo, Japan, assignor to Kabushiki Kaisha Murakoshi Seiko, Tokyo, Japan
Filed Dec. 6, 1988, Ser. No. 280,730
Claims priority, application Japan, Jun. 16, 1988, 63-23958
Term of patent 14 years
U.S. Cl. D8—323

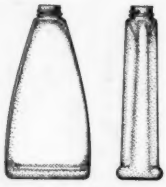


304,013
WEDGE CLAMP HOUSING FOR A DOWNRIGGER FISHING ASSEMBLY
Sam V. McCue, 805 Holly, Coulee Dam, Wash. 99116
Continuation of Ser. No. 76,997, Jul. 20, 1987, which is a continuation of Ser. No. 846,933, Apr. 1, 1986, abandoned. This application Mar. 14, 1989, Ser. No. 323,552
Term of patent 14 years
U.S. Cl. D8—396

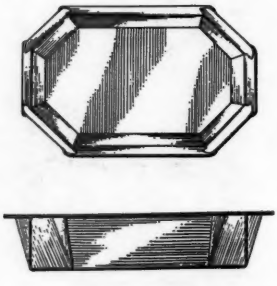
304,014
PAINT CONTAINER
Mark E. O'Connell, Cedar Grove, Wis., assignor to Thomas Industries Inc., Sheboygan, Wis.
Filed Nov. 5, 1986, Ser. No. 927,418
Term of patent 14 years
U.S. Cl. D9—372



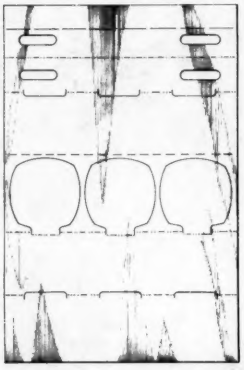
304,015
BOTTLE
Ronald G. Cramer, Racine County, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.
Filed Feb. 14, 1986, Ser. No. 833,454
Term of patent 14 years
U.S. Cl. D9—389



304,016
TUB FOR PACKAGING FOOD OR THE LIKE
Hampton H. Forbes, Jr., Newark, Del., assignor to Westvaco Corporation, New York, N.Y.
Filed Mar. 13, 1986, Ser. No. 844,727
Term of patent 14 years
U.S. Cl. D9—425

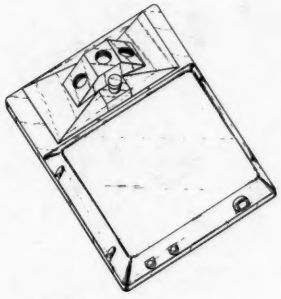


304,017
ARTICLE CARRIER BLANK
James R. Oliff, Austell, Ga., assignor to The Mead Corporation, Dayton, Ohio
Filed Jan. 30, 1987, Ser. No. 9,405
Term of patent 14 years
U.S. Cl. D9—433



304,018
ALARM CLOCK WITH VOICE RECORDER
Hidekatsu Nomizu, Yoshida, Japan, assignor to TWIN BIRD Industrial Company Limited, Japan
Filed Nov. 25, 1986, Ser. No. 934,926
Term of patent 14 years
U.S. Cl. D10—2

304,019
COMBINED MOTION SENSOR AND MOUNTING FOR ADJUSTABLE FLOOD LIGHTS
John P. Carsello, Telford, Pa., assignor to The Lamson & Sessions Co., Cleveland, Ohio
Filed Feb. 24, 1986, Ser. No. 835,325
Term of patent 14 years
U.S. Cl. D10—106



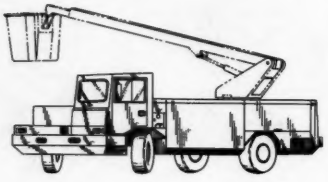
304,020
EXPANSION BRACELET
Murray L. Cowan, Norwood, Mass., assignor to Textron, Inc.
Filed Jul. 20, 1987, Ser. No. 77,401
Term of patent 14 years
U.S. Cl. D11—25

304,021
SIMULATED FLOWER WITH INFLATED BLOSSOM
Robert Shives, and Jeny Shives, both of 327 S. Union St., Sparta, Mich. 49345
Filed Oct. 30, 1986, Ser. No. 925,147
Term of patent 14 years
U.S. Cl. D11—117

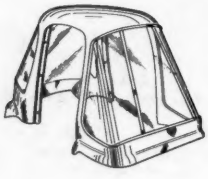
304,022
POT FOR PLANTS
Morton White, No. Kingstown, R.I., assignor to New England AG Tech, Inc., Cranston, R.I.
Filed May 26, 1987, Ser. No. 54,882
Term of patent 14 years
U.S. Cl. D11—155

304,023
FASTENER
Hiroo Minami, Uozu, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan
Filed Aug. 11, 1987, Ser. No. 83,961
Claims priority, application Japan, Apr. 3, 1987, 62-12901
Term of patent 14 years
U.S. Cl. D11—221

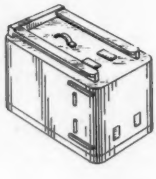
304,024
AIRCRAFT DEICER VEHICLE
Paul D. Eckstedt, San Jose, Calif., and Thomas W. Whitmire, Winter Park, Fla., assignors to FMC Corporation, Chicago, Ill.
Filed Apr. 25, 1986, Ser. No. 857,573
Term of patent 14 years
U.S. Cl. D12—14



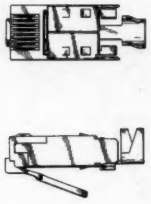
304,025
CANOPY FOR A MOTOR VEHICLE
Kim T. Bolvary, 6 Cowan Place, Safety Bay, Australia, assignor to Kim Tibor Bolvary, Safety Bay, Australia
Filed Feb. 24, 1986, Ser. No. 835,319
Claims priority, application Australia, Aug. 27, 1985, 2396/85
Term of patent 14 years
U.S. Cl. D12—156



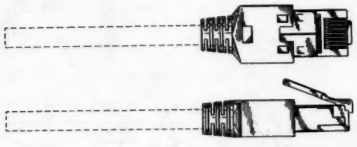
304,026
BATTERY PACK FOR ELECTRONIC BAR CODE READER
Donna E. Goodner, and Jamshid Naderi, both of Charlotte, N.C., assignors to Hand Held Products, Inc., Charlotte, N.C.
Filed Sep. 30, 1988, Ser. No. 252,355
Term of patent 14 years
U.S. Cl. D13—8



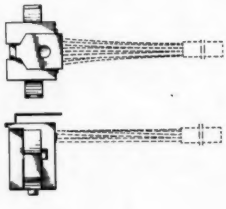
304,027
ELECTRICAL CONNECTOR PLUG
Shuichi Matsuzaki, Tokyo, Japan, assignor to Hirose Electric Co., Ltd., Tokyo, Japan
Filed Feb. 24, 1987, Ser. No. 18,181
Claims priority, application Japan, Sep. 10, 1986, 61-35712
Term of patent 14 years
U.S. Cl. D13—24



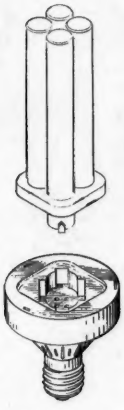
304,028
ELECTRICAL CONNECTOR PLUG
Shuichi Matsuzaki, Tokyo, Japan, assignor to Hirose Electric Co., Ltd., Tokyo, Japan
Filed Feb. 24, 1987, Ser. No. 18,182
Claims priority, application Japan, Sep. 10, 1986, 61-35711
Term of patent 14 years
U.S. Cl. D13—24



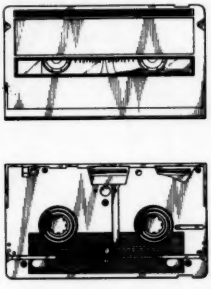
304,029
ELECTRICAL CONNECTOR PLUG
Shuichi Matsuzaki, Tokyo, Japan, assignor to Hirose Electric Co., Ltd., Tokyo, Japan
Filed Feb. 24, 1987, Ser. No. 18,183
Claims priority, application Japan, Sep. 10, 1986, 61-35710
Term of patent 14 years
U.S. Cl. D13—24



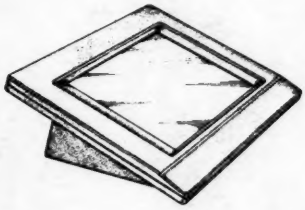
304,030
FLUORESCENT LAMP ADAPTER BASE
Usman U. Vakil, Diamond Bar, Calif., assignor to Lights Of America, Inc., Walnut, Calif.
Filed Oct. 5, 1987, Ser. No. 104,414
Term of patent 14 years
U.S. Cl. D13—25



304,031
CASSETTE FOR A VIDEO TAPE RECORDER
Kenji Nishiyama, Nara; Hanji Takahashi, Hyogo, and Yoshitomo Itakura, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Oct. 16, 1986, Ser. No. 919,927
Claims priority, application Japan, Jun. 23, 1986, 61-24223
Term of patent 14 years
U.S. Cl. D14—121

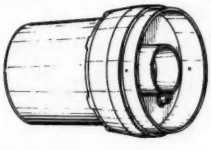


304,032
COMPUTER DISPLAY
Irwin M. Fine, Aberdeen, N.J., and David A. Harms, Glen Ellyn, Ill., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Information Systems Inc., Morristown, N.J.
Filed Apr. 13, 1987, Ser. No. 38,274
Term of patent 14 years
U.S. Cl. D14—113

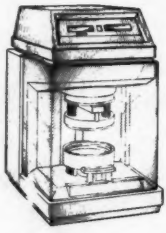


304,033
COMBINED RADIO SUPPORT AND SPEAKERS FOR BICYCLES AND THE LIKE
Sergio E. Villanueva, and Xavier R. Villanueva, both of San Ysidro, Calif., assignors to Novi, Inc., San Diego, Calif.
Filed Oct. 28, 1986, Ser. No. 924,588
Term of patent 14 years
U.S. Cl. D14—224

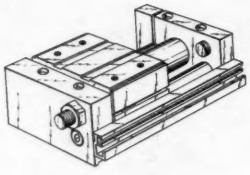
304,034
CONVERTER FOR A SATELLITE RECEIVING ANTENNA
Sinzi Nagaoka, Fukaya, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Feb. 26, 1986, Ser. No. 833,048
Claims priority, application Japan, Aug. 27, 1985, 60-35896
Term of patent 14 years
U.S. Cl. D14—231



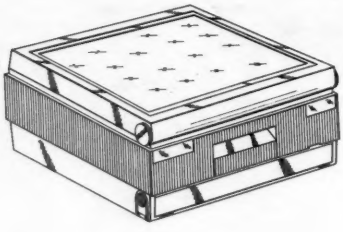
304,035
BADGE MAKING MACHINE
Austin H. Munson, Waunakee, and Daniel R. Bullis, Jr., Madison, both of Wis., assignors to Badge-A-Minit, Ltd., LaSalle, Ill.
Filed Jun. 3, 1987, Ser. No. 57,839
Term of patent 14 years
U.S. Cl. D15—122



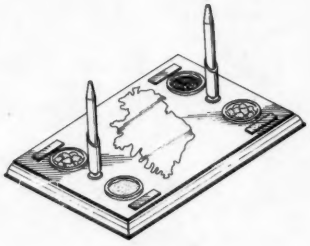
304,036
FLUIDIC POWER ACTUATOR
Michikazu Miyamoto, Soka, Japan, assignor to SMC Corporation, Tokyo, Japan
Filed Jul. 18, 1986, Ser. No. 886,680
Claims priority, application Japan, Jan. 20, 1986, 61-1813
Term of patent 14 years
U.S. Cl. D15—199



304,037
SLIDE VIEWER
Udo M. Geissler, Munich, Fed. Rep. of Germany, assignor to OSRAM Gesellschaft mit beschraenkter Haftung, Munich, Fed. Rep. of Germany
Filed Jun. 6, 1986, Ser. No. 872,374
Claims priority, application Fed. Rep. of Germany, Jan. 24, 1986, 16501
Term of patent 14 years
U.S. Cl. D16—229



304,038
DESK SET
David Janson, Richenbachstrasse 176, 6430 Schwyz, Switzerland
Filed May 15, 1986, Ser. No. 863,477
Term of patent 14 years
U.S. Cl. D19—82



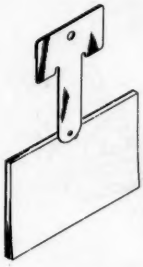
304,039
RAILROAD WARNING SIGN
Robert D. Henderson, 12806 Castle Rd., Louisville, Ky. 40272, and Robert L. Poore, Jr., 1537 Walter Ave., Louisville, Ky. 40215
Filed Dec. 23, 1986, Ser. No. 945,328
Term of patent 14 years
U.S. Cl. D20—10

304,040

DISPENSER/MOUNT FOR INFORMATIONAL SHEETS

James L. Thul, Plymouth, Minn., assignor to Bureau of Engraving, Inc., Minneapolis, Minn.

Filed Mar. 7, 1986, Ser. No. 842,041
Term of patent 14 years
U.S. Cl. D20—22

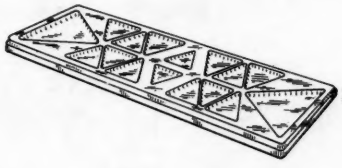


304,041

GAME BOARD

Marlene F. Meeker, 1802 Regal La., Greensboro, N.C. 27410, and John M. Baynes, 2607 E. Wendover Ave., Greensboro, N.C. 27405

Filed Jul. 31, 1986, Ser. No. 891,331
Term of patent 14 years
U.S. Cl. D21—20

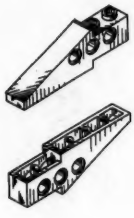


304,042

PROFILE ELEMENT (REAR) FOR A TOY AIRCRAFT WING

Ole V. Poulsen, Vejle, Denmark, assignor to Interlego A.G., Baar, Switzerland

Filed Dec. 2, 1987, Ser. No. 127,886
Term of patent 14 years
U.S. Cl. D21—91



304,043

WHEEL HOLDER ELEMENT FOR A TOY AIRCRAFT

Erik P. Tapdrup, Virum, Denmark, assignor to Interlego A.G., Baar, Switzerland

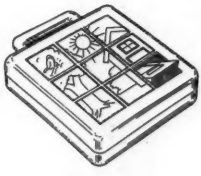
Filed Dec. 2, 1987, Ser. No. 128,525
Term of patent 14 years
U.S. Cl. D21—91

304,044

TURNING PICTURES PLAYBOX

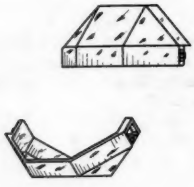
Elliot A. Rudell, 2215 W. 237th St., Torrance, Calif. 90501, and Joseph S. Cernansky, Lomita, Calif., assignors to Elliot A. Rudell, Torrance, Calif.

Filed Apr. 7, 1986, Ser. No. 850,398
Term of patent 14 years
U.S. Cl. D21—104



304,045
WIRE PUZZLE
Saburo Hasegawa, 17-4, Higashiogu 5-Chome, Arakawa-Ku, Tokyo, Japan
Filed Jun. 15, 1987, Ser. No. 61,405
Claims priority, application Japan, Dec. 23, 1986, 61-50835
Term of patent 14 years
U.S. Cl. D21—106

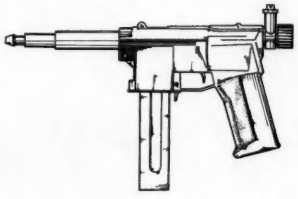
304,046
EXTERNALLY CURVED TOY WALL ELEMENT
Jens N. Knudsen, Billund, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Dec. 2, 1987, Ser. No. 127,882
Term of patent 14 years
U.S. Cl. D21—108



304,047
TOY ROTOR ELEMENT
Erling T. Diderikssen, Billund, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Dec. 2, 1987, Ser. No. 128,489
Term of patent 14 years
U.S. Cl. D21—108

304,048
TOY RAMP OR THE LIKE
Lawrence O. Freese, Providence, R.I., assignor to Dart Industries Inc., Deerfield, Ill.
Filed Jul. 16, 1986, Ser. No. 887,009
Term of patent 14 years
U.S. Cl. D21—109

304,049
TOY WATER GUN WITH EXTENSIBLE NOZZLE
Fu-Kuei Lee, P.O. Box 10780, Taipei 10099, Taiwan
Filed Nov. 19, 1987, Ser. No. 122,663
Term of patent 14 years
U.S. Cl. D21—147



304,050
FINGER PUPPET
Jacqueline B. Dickens, 965 Havensport Dr., Cincinnati, Ohio 45240
Filed Oct. 28, 1986, Ser. No. 924,492
Term of patent 14 years
U.S. Cl. D21—153

304,051
FINGER PUPPET
Jacqueline B. Dickens, 965 Havensport Dr., Cincinnati, Ohio 45240
Filed Oct. 28, 1986, Ser. No. 924,493
Term of patent 14 years
U.S. Cl. D21—153

304,052
FINGER PUPPET
Jacqueline B. Dickens, 965 Havensport Dr., Cincinnati, Ohio 45240
Filed Oct. 28, 1986, Ser. No. 924,584
Term of patent 14 years
U.S. Cl. D21—153

304,053
FINGER PUPPET
Jacqueline B. Dickens, 965 Havensport Dr., Cincinnati, Ohio 45240
Filed Oct. 28, 1986, Ser. No. 924,585
Term of patent 14 years
U.S. Cl. D21—153

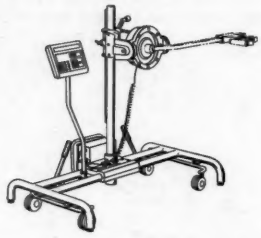
304,054
HOUSE SCULPTURE TOY FIGURE
John B. Van Meter, Rte. 5, Edgemont Rd., Maysville, Ky. 41056
Filed Sep. 22, 1986, Ser. No. 910,191
Term of patent 14 years
U.S. Cl. D21—155

304,055
TOY ANIMAL
Henry Neville, Lane Cove, Australia, assignor to Down Under Orphans Pty. Limited, North Sydney, Australia
Filed Aug. 18, 1986, Ser. No. 897,771
Claims priority, application Australia, Feb. 19, 1986, 4239/86
Term of patent 14 years
U.S. Cl. D21—159

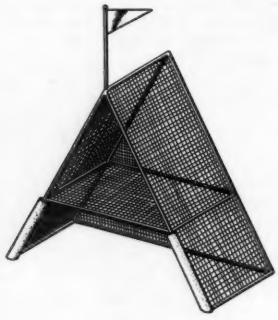
304,056
TOY KITTEN FIGURE
Jane P. Seifert, 46 Princeton Ct., Cheektowaga, N.Y. 14225
Filed Aug. 28, 1986, Ser. No. 901,458
Term of patent 14 years
U.S. Cl. D21—163

304,057
EXERCISE ROD
Timothy H. Cooper, 420 Linden St., Laguna Beach, Calif. 92651
Filed Feb. 9, 1987, Ser. No. 12,782
Term of patent 14 years
U.S. Cl. D21—191

304,058
SHOULDER AND ARM EXERCISE MACHINE
Robert B. Carlson, Bloomington, and Fredrick D. Wucherpfennig, both of Bloomington, Minn., assignors to The Toro Company, Minneapolis, Minn.
Filed Apr. 23, 1987, Ser. No. 41,577
Term of patent 14 years
U.S. Cl. D21—195

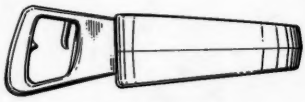


304,059
PYRAMID BALL GOAL POST
Moon H. Hong, 1640 Overland Dr., San Mateo, Calif. 94403
Filed Feb. 3, 1987, Ser. No. 15,125
Term of patent 14 years
U.S. Cl. D21—200



304,060
GOLF PUTTER HEAD
Paul L. Smith, 33723 Five Mile Rd. #202, Livonia, Mich. 48150
Filed Aug. 25, 1986, Ser. No. 899,628
Term of patent 14 years
U.S. Cl. D21—217

304,061
WATER SKI HANDLE
Leon Raiter, St. Cloud, Minn.; John Mor, Vernon, Canada, and Devlin Hunt, Brainard, Minn., assignors to Ski-free Marine, Inc., Calgary, Canada
Filed Sep. 18, 1986, Ser. No. 909,087
Term of patent 14 years
U.S. Cl. D21—230



304,062
SEMI-AUTOMATIC RIFLE
Ronnie G. Barrett, P.O. Box 1077, Murfreesboro, Tenn. 37130
Filed Nov. 27, 1987, Ser. No. 126,295
Term of patent 14 years
U.S. Cl. D22—103

304,063

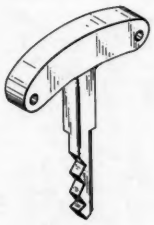
SELF DEFENSE WEAPON OR SIMILAR ARTICLE

Oscar R. Story, and Carol A. Story, both of 700 Richards Lake Rd., Fort Collins, Colo. 80524

Filed Jun. 26, 1987, Ser. No. 66,652

Term of patent 14 years

U.S. Cl. D22—117



304,064

INSECT REPELLER

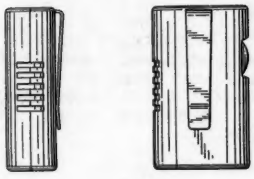
John S. Yuen, Kowloon, Hong Kong, assignor to John Manufacturing Limited, Kowloon, Hong Kong

Filed Aug. 14, 1986, Ser. No. 896,222

Claims priority, application United Kingdom, Mar. 4, 1986, 1032615

Term of patent 14 years

U.S. Cl. D22—120



304,065

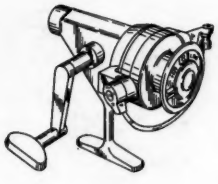
FISHING REEL

Robert E. Haynes, Foley, Ala., assignor to Lew Childre & Sons, Inc., Foley, Ala.

Continuation of Ser. No. 760,665, Jul. 30, 1985, abandoned. This application Dec. 19, 1988, Ser. No. 287,594

Term of patent 14 years

U.S. Cl. D22—141



304,066

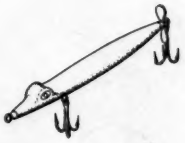
FISHING LURE

Kenneth R. Bates, 1119 Chatham Heights, Martinville, Va. 24112

Filed Jul. 27, 1987, Ser. No. 78,061

Term of patent 14 years

U.S. Cl. D22—129



304,067

FISHING HOOK AND SWIVEL HOLDER

Gary P. Ward, 4655 SW. 165th St., Beaverton, Oreg. 97007

Filed Apr. 26, 1988, Ser. No. 187,091

Term of patent 14 years

U.S. Cl. D22—149

304,068

COMBINED SPRAY GUN AND CLOSURE CAP

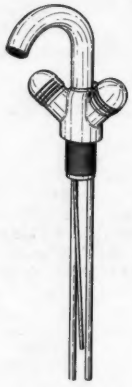
Walter B. Herbst, Evanston, Ill., assignor to Thomas Industries, Inc., Sheboygan, Wis.

Filed Jun. 8, 1987, Ser. No. 59,265

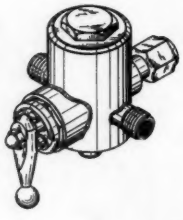
Term of patent 14 years

U.S. Cl. D23—226

304,069
FAUCET HANDLE
Andreas Haug, Altensteig, and Thomas Schönherr, Egenhausen, both of Fed. Rep. of Germany, assignors to Hans Grohe GmbH & Co. KG, Fed. Rep. of Germany
Filed Mar. 16, 1987, Ser. No. 25,863
Claims priority, application Fed. Rep. of Germany, Sep. 18, 1986, MR12680B
Term of patent 14 years
U.S. Cl. D23—243

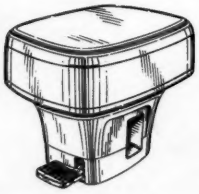


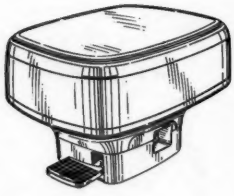
304,070
SHUT-OFF VALVE FOR SPECIALTY GASES
Richard E. Hughes, 821 Loma Dr., Hermosa Beach, Calif. 90254
Filed Mar. 17, 1986, Ser. No. 844,766
Term of patent 14 years
U.S. Cl. D23—245



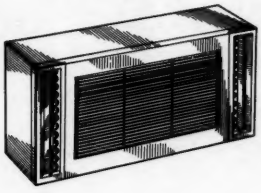
304,071
FAUCET HANDLE
Andreas Haug, Altensteig, and Thomas Schönherr, Egenhausen, both of Fed. Rep. of Germany, assignors to Hans Grohe GmbH & Co. KG, Fed. Rep. of Germany
Filed Mar. 16, 1987, Ser. No. 25,861
Claims priority, application Fed. Rep. of Germany, Sep. 18, 1986, MR12680B
Term of patent 14 years
U.S. Cl. D23—250

304,072
TOILET
John M. Stewart, Park, Canada, assignor to Sanitation Equipment Limited, Concord, Canada
Filed Oct. 14, 1986, Ser. No. 918,423
Term of patent 14 years
U.S. Cl. D23—295



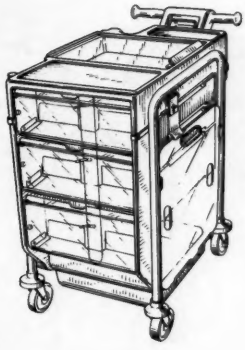


304,073
HOUSING FOR A CEILING MOUNTED AIR CONDITIONER
Hideyuki Ikeda, and Shigeru Saito, both of Kamakura, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Jun. 26, 1986, Ser. No. 879,187
Claims priority, application Japan, Jan. 16, 1986, 61-1089
Term of patent 14 years
U.S. Cl. D23—351



304,074
SUSPENDED FIREPLACE GRATE
John W. Moroney, Glendora, Calif., assignor to Superior Fireplace Company, Fullerton, Calif.
Filed Jan. 24, 1986, Ser. No. 822,041
Term of patent 14 years
U.S. Cl. D23—398

304,075
EMERGENCY MEDICAL CRASH CART
Robert J. Welch, Dallas, Pa., assignor to InterMetro Industries Corporation, Wilkes-Barre, Pa.
Filed Feb. 4, 1987, Ser. No. 10,650
Term of patent 14 years
U.S. Cl. D24—1.1



304,076
WATER JET TEETH CLEANER
Michael J. Primiano, 4540 SW. Dogwood Dr., Lake Oswego, Oreg. 97035
Filed Oct. 5, 1987, Ser. No. 104,307
Term of patent 14 years
U.S. Cl. D24—15

304,077

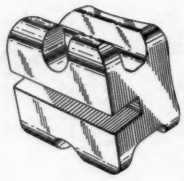
ORTHODONTIC BRACKET

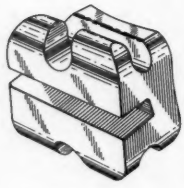
Jirina V. Pospisil, Monrovia, Calif., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 4, 1987, Ser. No. 21,868

Term of patent 14 years

U.S. Cl. D24—16





304,078

OPTICAL ZONE MARKER

Ronald P. Jensen, 1612 Golf Club Dr., Glendale, Calif. 91206

Filed May 4, 1987, Ser. No. 45,637

Term of patent 14 years

U.S. Cl. D24—26

304,079

FLASHBACK STRUCTURE FOR A CATHETER HAVING A TRANSPARENT COVER

Richard H. McFarlane, Geneva, Ill., assignor to Taut, Inc., Geneva, Ill.

Filed Jul. 31, 1987, Ser. No. 80,376

Term of patent 14 years

U.S. Cl. D24—54

304,080

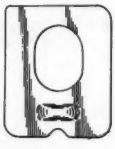
URINE COLLECTOR ATTACHMENT PAD

Lee & Smith; Paul H. Hanifl, Barrington, and John J. Newton, Jr., Palatine, both of Ill., assignors to Sage Products, Inc., Cary, Ill.

Filed Aug. 5, 1987, Ser. No. 82,065

Term of patent 14 years

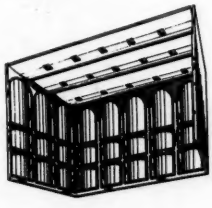
U.S. Cl. D24—54



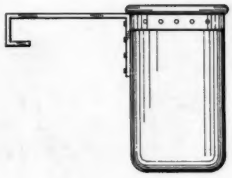
304,081
MULTI-STORIED BUILDING
Radu Vero, 345 E. 80th St., New York, N.Y. 10021
Filed Aug. 25, 1986, Ser. No. 900,346
Term of patent 14 years
U.S. Cl. D25—5

304,082
OUTDOOR TOILET CABANA
George W. Harding, Clearwater, Fla., assignor to Poly-John Enterprises Corp., Whiting, Ind.
Filed Feb. 9, 1987, Ser. No. 12,676
Term of patent 14 years
U.S. Cl. D25—16

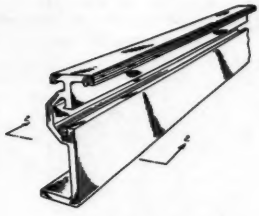
304,083
BAND SHELL
James F. Jenné , Palos Verdes Estates, Calif., assignor to Wenger Corporation, Owatonna, Minn.
Filed Feb. 13, 1987, Ser. No. 14,527
Term of patent 14 years
U.S. Cl. D25—58



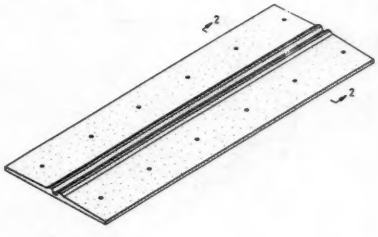
304,084
LADDER CADDY
Kenneth H. Meng, 19750 Sheldon Rd., Brook Park, Ohio 44142
Filed Jul. 7, 1988, Ser. No. 216,259
Term of patent 14 years
U.S. Cl. D25—68



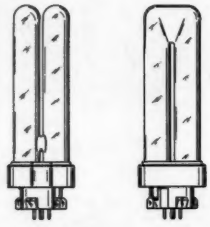
304,085
EXTRUSION FOR USE IN THE CONSTRUCTION OF A FLOOR OF A MOTOR LORRY
Philip K. Hockney, Smithfield, Australia, assignor to Hockney Pty. Limited, New South Wales, Australia
Filed Feb. 10, 1986, Ser. No. 828,025
Claims priority, application Australia, Sep. 19, 1984, 8946/84
Term of patent 14 years
U.S. Cl. D25—119



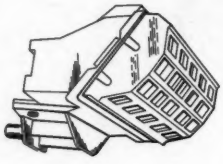
304,086
FENCE RUNNER
Stephen R. Eads, 6113 Woodcrest Dr., Tuscaloosa, Ala. 35405
Filed Sep. 23, 1987, Ser. No. 99,994
Term of patent 14 years
U.S. Cl. D8—1



304,087
COMPACT FLUORESCENT LAMP
Horst Porembski, Munich, and Michael Kappler, Friedberg, both of Fed. Rep. of Germany, assignors to OSRAM GmbH, Munich, Fed. Rep. of Germany
Filed Feb. 9, 1987, Ser. No. 12,204
Claims priority, application Fed. Rep. of Germany, Aug. 21, 1986, 007384
Term of patent 14 years
U.S. Cl. D26—3

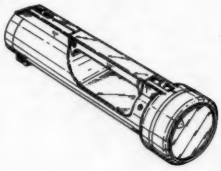


304,088
DOOR OPERATED CONVENIENCE LIGHT FOR STORAGE AREAS
David A. Kelley, Marshall; Delbert J. Corkins, Battle Creek, and Robert S. Hileman, Marshall, all of Mich., assignors to Progressive Dynamics, Inc., Marshall, Mich.
Filed Oct. 24, 1986, Ser. No. 923,730
Term of patent 14 years
U.S. Cl. D26—24

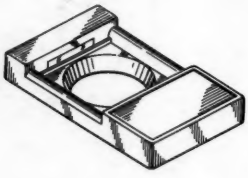


304,089
MULTI-FUNCTION LANTERN
Yiu C. A. Wan, Kowloon, Hong Kong, assignor to Fee Tat Plastic Factory Limited, Aberdeen, Hong Kong
Filed Jan. 5, 1987, Ser. No. 956
Claims priority, application United Kingdom, Oct. 13, 1986, 1037337
Term of patent 14 years
U.S. Cl. D26—42

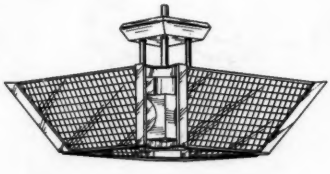
304,090
MULTI-FUNCTION LANTERN
Yiu C. A. Wan, Hong Kong, Hong Kong, assignor to Fee Tat Plastic Factory Limited, Aberdeen, Hong Kong
Filed Jan. 5, 1987, Ser. No. 957
Claims priority, application United Kingdom, Oct. 13, 1986, 1037338
Term of patent 14 years
U.S. Cl. D26—42



304,091
LOCK ILLUMINATOR
Dennis E. Fuller, 26586 Windsor Ave., Elkhart, Ind. 46514
Filed Aug. 20, 1986, Ser. No. 898,109
Term of patent 14 years
U.S. Cl. D26—72



304,092
LIGHT FIXTURE
Fredrick R. Glassman, 9170 La Alba Dr., Whittier, Calif. 90603
Filed Jan. 7, 1987, Ser. No. 1,091
Term of patent 14 years
U.S. Cl. D26—85

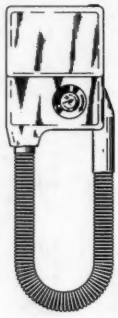


304,093
LAMP
Alfred Holter, Frederik Hendrik Plantsoen 94, 3e 1052 XX Amsterdam, Netherlands
Filed Sep. 26, 1986, Ser. No. 912,813
Claims priority, application Benelux, Jul. 7, 1986, 61235-01/02
Term of patent 14 years
U.S. Cl. D26—94

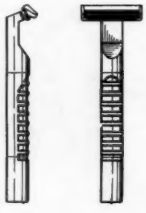
304,094
DISPOSABLE COSMETIC APPLICATOR AND CONTAINER THEREOF
Robert A. Bennett, Easton, Conn., assignor to R. J. S. Industries, Inc., Marlboro, N.J.
Filed Dec. 9, 1986, Ser. No. 939,455
Term of patent 14 years
U.S. Cl. D28—7

304,095
MASCARA APPLICATOR CONTAINER
Ellen Gavin, Atlantic Highlands, N.J., assignor to L'Oreal S.A., Paris, France
Filed Mar. 27, 1987, Ser. No. 31,507
Term of patent 14 years
U.S. Cl. D28—7

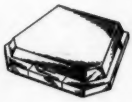
304,096
WALL MOUNTED HAIR DRYER
Roland Nithardt, Yverdon-les-Bains, Switzerland, assignor to Elite S.R.L., Italy
Filed Apr. 13, 1987, Ser. No. 37,567
Claims priority, application Int'l Pat. Institute, Oct. 14, 1986, DM/007,625
Term of patent 14 years
U.S. Cl. D28—12



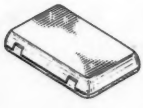
304,097
RAZOR OR SIMILAR ARTICLE
Giampiero Bonori, Bologna, Italy, assignor to Joren Marketing Ltd., Zurich, Switzerland
Filed Nov. 21, 1986, Ser. No. 942,462
Term of patent 14 years
U.S. Cl. D28—46



304,098
COMPACT
Joel Desgrippes, Paris, France, assignor to Albion Cosmetics Co., Ltd., Japan
Filed Apr. 17, 1987, Ser. No. 40,200
Claims priority, application Japan, Jan. 13, 1987, 62-582
Term of patent 14 years
U.S. Cl. D28—78

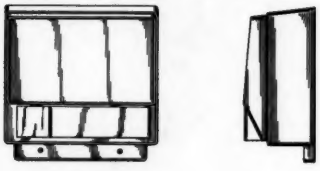


304,099
COSMETIC CASE
Karena Bakic, Varese, Italy, assignor to Cosmede Anstalt, Vaduz, Liechtenstein
Filed Nov. 14, 1986, Ser. No. 930,860
Claims priority, application Fed. Rep. of Germany, May 15, 1986, URA 652/86
Term of patent 14 years
U.S. Cl. D28—83

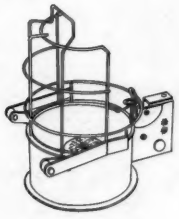


304,100
BELT ATTACHED UMPIRE HAND PROTECTOR
Ronald N. Brown, 4195 S. Oneida, Denver, Colo. 80237
Filed Oct. 17, 1986, Ser. No. 920,850
Term of patent 14 years
U.S. Cl. D29—20

304,101
HAND DRYER
Joseph R. Mango, Midlothian, Ill., assignor to World Dryer Division of Specialty Equipment Companies, Inc., Berkeley, Ill.
Filed Apr. 18, 1986, Ser. No. 855,778
The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.
Term of patent 14 years
U.S. Cl. D28—54.1

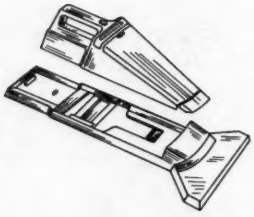


304,102
SOLID DETERGENT DISPENSER
Haresh C. Lakhan, Eagan; Lawrence W. Switala, Minneapolis, and Kim J. Ashton, Vadnais Heights, all of Minn., assignors to Ecolab Inc., St. Paul, Minn.
Filed Apr. 30, 1987, Ser. No. 44,552
Term of patent 14 years
U.S. Cl. D32—1



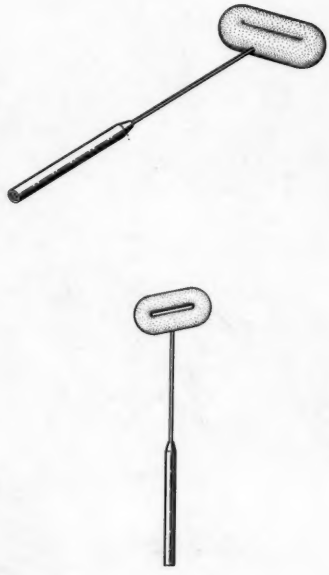
304,103
VACUUM-BLOWER UNIT
Walter F. Ruhl, Greenville, Ohio; Jeffrey A. Steed, Union City, Ind., and James M. Weaver, Greenville, Ohio, assignors to Lambert Corporation, Ohio
Filed Oct. 19, 1987, Ser. No. 109,682
Term of patent 14 years
U.S. Cl. D32—15

304,104
CORDLESS VACUUM CLEANER
Gerhard Busalt, Biblis, and Franz A. Stiltzer, Offenbach am Main, both of Fed. Rep. of Germany, assignors to Rowenta-Werke GmbH, Offenbach am Main, Fed. Rep. of Germany
Filed Dec. 4, 1986, Ser. No. 938,138
Claims priority, application Fed. Rep. of Germany, Jun. 11, 1986, 5MR10681
Term of patent 14 years
U.S. Cl. D32—18



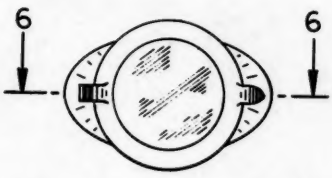
304,105
SPRAY-TYPE, VACUUM CLEANER
Tom A. McAllister, Mississauga; John S. McAllister, Pickering, and William R. Bonnar, Whitby, all of Canada, assignors to American Home Products Corporation, New York, N.Y.
Filed Oct. 26, 1987, Ser. No. 113,805
Claims priority, application Canada, May 5, 1987, 05-05-87-4
Term of patent 14 years
U.S. Cl. D32—21

304,106
CLEANING TOOL FOR CEILING FAN BLADES
Michael J. Dobson, Rte. 15, Box 190; James P. Kelley, Rte. 14, Box 458, both of Gadsden, Ala. 35903, and Michael E. Wilcutt, Rte. 1, Box 483, Gadsden, Ala. 35901
Filed Jan. 27, 1987, Ser. No. 7,437
Term of patent 14 years
U.S. Cl. D32—40



304,107
DUSTPAN
Donald R. Noggle, 329 Bay St., Harbor Springs, Mich. 49740
Filed Mar. 6, 1987, Ser. No. 23,472
Term of patent 14 years
U.S. Cl. D32—74

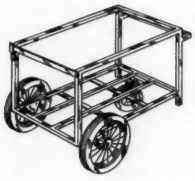
304,108
COMBINED SHIRT POCKET CUSPIDOR AND ASHTRAY OR SIMILAR ARTICLE
Mark R. Lange, 3624 Hwy. 3, Dickinson, Tex. 77539
Filed Oct. 27, 1986, Ser. No. 923,742
Term of patent 14 years
U.S. Cl. D34—2



304,109
DISPOSAL CONTAINER FOR SHARP ARTICLES OR THE LIKE
Paul H. Hanifl, Barrington, Ill., assignor to Sage Products, Inc., Cary, Ill.
Filed Oct. 16, 1986, Ser. No. 919,776
Term of patent 14 years
U.S. Cl. D34—7

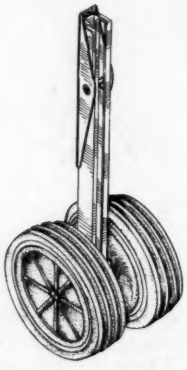
304,110
GOLF CART
Fu H. Yang, No. 158-1, 3rd Floor, Chao-chou St., Taipei, Taiwan
Filed Jan. 14, 1987, Ser. No. 3,228
Term of patent 14 years
U.S. Cl. D34—15

304,111
REFUSE CONTAINER CART
Joseph Mehalick, 612 Scenic Dr., Graham, N.C. 27253
Filed Nov. 20, 1987, Ser. No. 123,664
Term of patent 14 years
U.S. Cl. D34—18

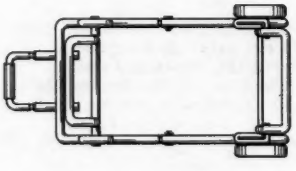


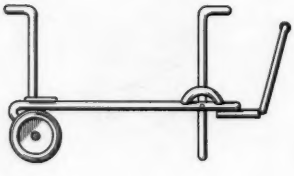
304,112
CART FOR USE AS STAND OR WORK STATION TABLE
Peter D. Bettess, Belair, Australia, assignor to Micro-Shuttle Australia Pty. Ltd., Marleston, Australia
Filed Nov. 24, 1986, Ser. No. 934,418
Claims priority, application Australia, Jul. 30, 1986, 6108/86
Term of patent 14 years
U.S. Cl. D34—21

304,113
BOAT CARRIER
Malcolm P. Smith, 22 Delaware Road, Ermington, New South Wales, Australia (2115)
Filed Mar. 3, 1987, Ser. No. 21,025
Term of patent 14 years
U.S. Cl. D34—24

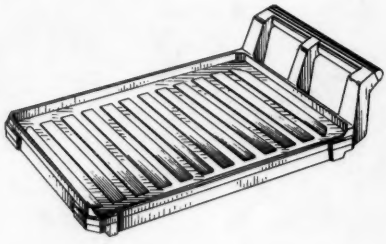


304,114
ICE CHEST CARRIER
Mark A. David, 513A Water's Edge, Newport News, Va. 23606
Filed Aug. 10, 1987, Ser. No. 83,298
Term of patent 14 years
U.S. Cl. D34—24

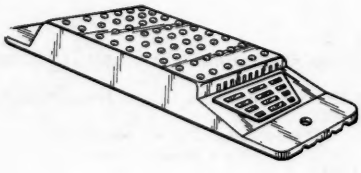




304,115
TOP SHELF FOR A MODULAR CART
Robert J. Cohn, Dallas, Pa., assignor to InterMetro Industries Corporation, Wilkes-Barre, Pa.
Filed Sep. 18, 1987, Ser. No. 98,030
Term of patent 14 years
U.S. Cl. D34—27

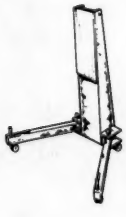


304,116
VENTILATING COVER FOR CONTAINER
Seo Y. Jun, 1-1205, Hongsil Apartment, 79 Samsung-Dong, Kangnam-Ku, Seoul, D.P.R. of Korea
Filed Jan. 27, 1986, Ser. No. 823,040
Claims priority, application D.P.R. of Korea, Sep. 23, 1985, 13525/1985
Term of patent 14 years
U.S. Cl. D34—28

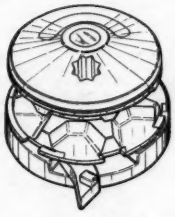


304,117
ELEVATING WORKING PLATFORM
Mitsuhiro Kishi, Tochigi Prefecture, Japan, assignor to Hikoma Mfg. Co., Ltd., Tochigi Prefecture, Japan
Filed Feb. 24, 1987, Ser. No. 18,124
Term of patent 14 years
U.S. Cl. D34—28

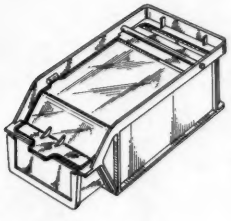
304,118
AUTOMOBILE HARDTOP STORAGE RACK
Phillip J. Snoke, Atlanta, and Frank B. Golley, Decatur, both of Ga., assignors to Atlanta Motoring Accessories, Inc., Norcross, Ga.
Filed Sep. 25, 1986, Ser. No. 811,631
Term of patent 14 years
U.S. Cl. D34—31



304,119
MARINE WINDLASS
Gordon M. Lyall, Glasgow, and Philip F. McCarron, Paisley, both of Great Britain, assignors to Simpson-Laurence Limited, Glasgow, Scotland
Filed Feb. 14, 1986, Ser. No. 829,806
Term of patent 14 years
U.S. Cl. D34—33

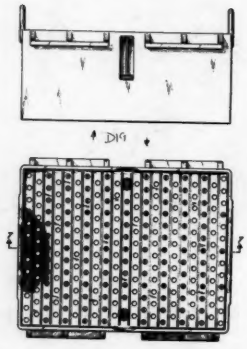


304,120
LIDDED STORAGE BIN
Larry W. Buchanan, Bramalea, and Ray A. Gargarella, Brampton, both of Canada, assignors to Buckhorn Material Handling Group, Inc., Milford, Ohio
Filed Jan. 7, 1987, Ser. No. 1,109
Term of patent 14 years
U.S. Cl. D34—40

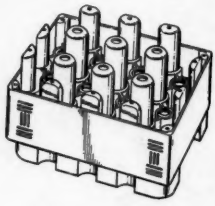


304,121
BOWL
Liwayway J. Gabayno, Capalinga, Philippines, assignor to Decra-Stone, Inc., Prior Lake, Minn.
Filed Dec. 9, 1986, Ser. No. 939,896
Term of patent 14 years
U.S. Cl. D34—42

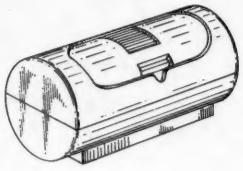
304,122
TOTE BOX
Norman W. Pontbriand, Jr., Wallingford, Conn., assignor to United Technologies Corporation, Hartford, Conn.
Filed Jun. 22, 1987, Ser. No. 65,192
Term of patent 14 years
U.S. Cl. D34—43



304,123
CRATE
Michael J. Warwick, Randburg, South Africa, assignor to South African Polymer Holdings (Proprietary), Limited), Marshalltown, South Africa
Filed Jan. 21, 1986, Ser. No. 821,065
Claims priority, application South Africa, Jul. 23, 1985, 85/0652
Term of patent 14 years
U.S. Cl. D34—46



304,124
ROLL TOP COIN HOLDER FOR AN AUTOMOBILE DASH
Marc R. Iacovelli, Miami, Fla., assignor to Rally Accessories, Inc., Miami, Fla.
Filed May 7, 1986, Ser. No. 860,769
Term of patent 14 years
U.S. Cl. D99—34



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 17TH DAY OF OCTOBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Ahlstrom Osakeyhtio: *See*—
Ruottu, Seppo, 4,874,584, Cl. 422-145.000.

A. Ahlstron Corporation: *See*—
Rantanen, Veikko O., 4,874,656, Cl. 428-216.000.

A-Bee Syndicate, Inc.: *See*—
Spitzer, Charles M.; and Siegel, Paul F., 4,874,209, Cl. 312-250.000.

A. E. Staley Manufacturing Company: *See*—
Hartman, Guy J., 4,874,625, Cl. 426-533.000.

A. Nattermann & Cie. GmbH: *See*—
Hager, Jorg; Ghyczy, Miklos; Feyen, Vincent; Imberge, Paul; Brandenburg, Ulrich; and Wilperath, Peter, 4,874,553, Cl. 260-403.000.

Abbott Laboratories: *See*—
Becker, Wallace E., 4,874,614, Cl. 424-465.000.
Katz, Leonard; Tuan, James; and McAlpine, James B., 4,874,748, Cl. 514-29.000.

Abe, Hidetoshi: *See*—
Nonomura, Tsutomu; and Abe, Hidetoshi, 4,873,924, Cl. 101-146.000.

Abe, Kunihiro, to Fuji Jukogyo Kabushiki Kaisha. Engine ignition timing control system. 4,873,958, Cl. 123-424.000.

Abe, Masayoshi: *See*—
Takagaki, Hidetsugu; Abe, Masayoshi; Watanabe, Michihiro; Takeuchi, Kazuyuki; Nakanishi, Shigenori; Nakata, Yuuko; and Yamazaki, Keiji, 4,874,855, Cl. 540-3.000.

Abe, Naoto: *See*—
Shimokoriyama, Makoto; Yamashita, Shinichi; Abe, Naoto; Kashida, Motokazu; Takei, Masahiro; and Takahashi, Koji, 4,875,090, Cl. 358-12.000.

Abe, Yohji: *See*—
Ando, Yashiko; Noda, Yasushi; and Abe, Yohji, 4,875,119, Cl. 360-105.000.

Abe, Yoshio: *See*—
Iimura, Seiji; Abe, Yoshio; Okumura, Jun; Naito, Takayuki; and Kamachi, Hajime, 4,874,856, Cl. 540-222.000.

Abell, Walter L. Colon hydrotherapy and evacuator system. 4,874,363, Cl. 604-28.000.

Abiko, Yasushi: *See*—
Kobayashi, Setsuo; Nakazawa, Tsugio; Yoshie, Yasumasa; Abiko, Yasushi; and Kameda, Kinya, 4,874,772, Cl. 514-341.000.

Abraham, Fabian, to Ramot University Authority for Applied Research and Industrial Development Ltd. Ophthalmologic apparatus for fundus examination. 4,874,236, Cl. 351-205.000.

Abrams, Richard; and Swartz, Conrad M., to Somatics, Inc. Electroconvulsive therapy apparatus and method for automatic monitoring of patient seizures. 4,873,981, Cl. 128-419.00S.

Abuyama, Yasuo: *See*—
Yamanishi, Eiichi; Abuyama, Yasuo; and Someya, Akihiko, 4,875,092, Cl. 358-75.000.

Achor, Donald P.: *See*—
Walker, Raymond M.; Achor, Donald P.; Baumgarten, Robert W.; and Bogard, Ralph B., 4,873,751, Cl. 29-156.80B.

Acushnet Company: *See*—
Zimbone, Paul J., 4,874,154, Cl. 267-140.400.

Adachi, Kuniaki; Tamai, Hideo; and Sadai, Masanao, to Lion Corporation. Stimulation of hair growth with aliphatic carboxylic acids. 4,874,791, Cl. 514-558.000.

Adair, Paul C., to Mead Corporation, The. Photocurable composition containing a photoreducible dye a thiol and an N,N'-dialkylaniline. 4,874,685, Cl. 430-138.000.

Adams, Kenneth D., to SSMC Inc. Stepper driven stitch patterning mechanism for sewing machines using spiral cam groove and follower. 4,873,932, Cl. 112-443.000.

Adams, Leonard G.: *See*—
Ellison, Larry J.; and Smelcer, John R., 4,873,779, Cl. 42-101.000.

Adams, William S., Jr.: *See*—
Newman, Harold L.; Adams, William S., Jr.; and Boyden, Brace, 4,874,521, Cl. 210-639.000.

Adir Et Cie: *See*—
Peglion, Jean L.; Poignant, Jean C.; and Vian, Joel, 4,874,878, Cl. 549-462.000.

Adler, Alfons: *See*—
Kule, Engelbert; and Adler, Alfons, 4,874,874, Cl. 548-544.000.

Adolph Coors Company: *See*—
Frenkel, Robert L.; Derks, Christopher S.; and Armstrong, Donald L., 4,874,079, Cl. 198-436.000.

Advanced Biomedical Devices, Inc.: *See*—
Winters, R. Edward, 4,873,983, Cl. 128-657.000.

Advanced Explosives Gesellschaft b.R.: *See*—
Bankhamer, Vinzenz; and Zeman, Gerhard, 4,874,441, Cl. 149-42.000.

Advanced Micro-Matrix, Inc.: *See*—
Michalchik, Michael, 4,874,549, Cl. 252-511.000.

AECI Limited: *See*—
Baker, Rodney C., 4,874,753, Cl. 514-89.000.

AEG-Elotherm GmbH: *See*—
Matthes, Hans G., 4,875,150, Cl. 363-51.000.

AFC, Inc.: *See*—
Fingerson, Conrad F.; Carlson, Dennis L.; Nelson, Bruce A.; and Eickhoff, Robert D., 4,874,180, Cl. 273-416.000.

Affeldt, Karl-Heinz; and Hantel, Ulrich, to Robert Bosch GmbH. Vasometric test apparatus for testing blood supply to the toe of a patient. 4,873,988, Cl. 128-687.000.

Agostinis, Enrico; Custro, Sergio; and Zazzetta, Alessandro, to Enichem Elastomeri S.p.A. Block copolymer and process for preparing it. 4,874,821, Cl. 525-271.000.

Ahmed, Bashir M.: *See*—
Donovan, Joseph C.; and Ahmed, Bashir M., 4,874,673, Cl. 428-463.000.

Aho, Kenneth A.; Melby, Jeffrey J.; and Miller, Richard A., to Minnesota Mining and Manufacturing Company. Back-lit display. 4,874,228, Cl. 350-345.000.

Air Products and Chemicals, Inc.: *See*—
Garg, Diwaker; Klucher, Beth A.; Dyer, Paul N.; Kidd, Richard W.; and Ceccarelli, Christopher, 4,874,642, Cl. 427-249.000.
Kuphal, Jeffrey A.; Robeson, Lloyd M.; and Weber, James J., 4,874,030, Cl. 164-34.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Kojima, Fumio; Tachiiri, Yoshikazu; and Kato, Yoshihisa, 4,874,174, Cl. 285-82.000.
Nishii, Michiharu; Ando, Masamoto; and Tada, Yoshihiko, 4,874,207, Cl. 303-52.000.
Ochiai, Hironori; Suzuki, Etsuo; and Ikuta, Kazuo, 4,874,202, Cl. 296-222.000.

Aisin Takaoka Limited: *See*—
Oono, Toshio, 4,874,064, Cl. 188-70.00R.

Ajinomoto Co., Inc.: *See*—
Higuchi, Ryoichi; Sakurai, Takao; Yokota, Tadahiko; Mikami, Naoko; Yamamoto, Eri; and Takeuchi, Koji, 4,874,542, Cl. 252-299.610.

Akana, Yoshinori: *See*—
Yatsu, Tadao; and Akana, Yoshinori, 4,874,647, Cl. 428-35.700.

Akasu, Hiroyuki: *See*—
Okamoto, Takehiko; Ohmory, Akio; Sueoka, Akinori; Kawata, Ichiro; and Akasu, Hiroyuki, 4,874,522, Cl. 210-645.000.

Akesaka, Toshio, to Kabushiki Kaisha Iseki Kaihatsu Koki. Method and apparatus for building pipeline and shield tunnelling machine. 4,874,268, Cl. 405-184.000.

Aki, Shinji: *See*—
Ueda, Hiraki; Miyamoto, Hisashi; Aki, Shinji; and Otsuka, Tatsuya, 4,874,764, Cl. 514-254.000.

Akiba, Shigeyuki: *See*—
Utaka, Katsuyuki; Sakai, Kazuo; Matsushima, Yuichi; and Akiba, Shigeyuki, 4,874,216, Cl. 350-96.190.

Akira, Mizusawa; and Kurihara, Kazumasa, to Nifco Inc. Filter for fuel tank. 4,874,510, Cl. 210-172.000.

Akiyama, Kazunori: *See*—
Takamatsu, Junichi; and Akiyama, Kazunori, 4,875,077, Cl. 355-212.000.

Akmese, Kemal. Dome structure. 4,873,796, Cl. 52-80.000.

Akutsu, Hidetoshi, to Mitsubishi Kinzoku Kabushiki Kaisha. Synchronizer ring in speed variator made of wear-resistant copper alloy having high strength and toughness. 4,874,439, Cl. 148-433.000.

Albany Research (UK) Limited: *See*—
Davis, Robert B.; Kramer, Charles E.; and Barlow, Sandra K., 4,874,660, Cl. 428-234.000.

Alcatel N.V.: *See*—
Boniort, Jean-Yves; and Leboucq, Jacques, 4,874,415, Cl. 65-3.110.

Aldrich, Dale J.: *See*—
Larson, Paul A.; Aldrich, Dale J.; and Berman, Jody R., 4,874,669, Cl. 428-416.000.

Aldrich, Paul E.; Duncia, John Jonas V.; and Pierce, Michael E., to Du Pont de Nemours, E. I., and Company. Tetrazole intermediates to antihypertensive compounds. 4,874,867, Cl. 548-101.000.

Alexander, Michael N.: *See*—
Sigai, A. Gary; Lapatovich, Walter P.; and Alexander, Michael N., 4,874,984, Cl. 313-486.000.

Alfa-Laval Thermal AB: *See*—
Nilsson, Bo, 4,874,039, Cl. 165-78.000.

Allen, David T.: *See*—
Edelen, Stephen A.; Allen, David T.; and Zylman, Bill E., 4,873,881, Cl. 74-336.00R.

Allen, Richard B.; Gibbs, William E.; and Hans, Lynn M., to General Electric Company. Expandable thermoplastic resin beads. 4,874,796, Cl. 521-59.000.

Allied-Signal Inc.: *See*—
Ditlinger, Richard J., 4,873,889, Cl. 74-579.00R.
Marshall, Robert M., 4,874,663, Cl. 428-272.000.
Tseng, Raymond R., 4,874,016, Cl. 137-826.000.

Alspector, Joshua, to Bell Communications Research, Inc. Neuromorphic learning networks. 4,874,963, Cl. 307-201.000.

Altshuler, John H.: *See*—
Miller, Curtis H.; Arenberg, I. Kaufman; and Altshuler, John H., 4,874,368, Cl. 604-82.000.

Aluminum Company of America: *See*—
Sawtell, Ralph R.; Bretz, Philip E.; and Jensen, Craig L., 4,874,440, Cl. 148-437.000.

ALZA Corporation: *See*—
Wong, Patrick S. L.; Theeuwes, Felix; and Eckenhoff, James B., 4,874,388, Cl. 604-891.100.

Amano, Itaru: *See*—
Ichikawa, Katumi; Amano, Itaru; Hujieda, Yasuhiko; Misumi, Shikao; Hukumura, Seisuke; and Miyauchi, Hideo, 4,874,303, Cl. 425-28.100.

Amdahl Corporation: *See*—
Cary, Richard W.; and Guyon, Richard D., 4,875,159, Cl. 364-200.000.

Amedei, Giuseppe; and Tornactore, Giovanni, to Fiatgeotech-Tecnologie per la terra S.p.A. Gearbox with electronically-controlled hydraulic clutches, for agricultural tractors and similar vehicles. 4,873,880, Cl. 74-336.00R.

American Brush Corporation: *See*—
Mayne, James K., 4,874,087, Cl. 206-362.400.

American Combustion, Inc.: *See*—
Gitman, Gregory M., 4,874,311, Cl. 432-13.000.

American Cyanamid Company: *See*—
Huffman, K. Robert, 4,874,539, Cl. 252-174.240.
Kimpara, Masaomi; Kawai, Kaiji; and Tobe, Yukiya, 4,874,425, Cl. 71-121.000.

American Display Inc.: *See*—
Hoffart, Andrew B., 4,873,776, Cl. 40-572.000.

American Glass and Metal Corporation: *See*—
Jeschke, Fred G., 4,873,806, Cl. 52-235.000.

American Home Products Corp.: *See*—
Pincus, David H., 4,874,695, Cl. 435-19.000.

American Maplan Corporation: *See*—
Gearhart, Kenton, 4,874,306, Cl. 425-192.00R.

American Sterilizer Company: *See*—
Dyke, Denis G., 4,874,090, Cl. 206-439.000.

American Tech Manufacturing Corp.: *See*—
Linker, Frank V.; and Linker, Frank V., Jr., 4,874,075, Cl. 193-39.000.

American Telephone and Telegraph Comopany, AT&T Bell Laboratories: *See*—
Nichols, Robert K.; and Roediger, Gary A., 4,875,206, Cl. 370-85.150.

American Telephone and Telegraph Company, AT&T Bell Laboratories: *See*—
Arroyo, Candido J.; and Patel, Parbhubhai D., 4,874,219, Cl. 350-96.230.
Escolar, Carlos, 4,875,037, Cl. 340-825.010.
Graf, Hans P.; and Howard, Richard E., 4,875,183, Cl. 364-807.000.
Pfeiffer, Loren N.; and West, Kenneth W., 4,873,833, Cl. 62-55.500.

American Telephone and Telegraph Company, AT&T-Technologies Inc.: *See*—
Elliott, William A.; Greene, Richard A.; Kennedy, Robert P.; Poe, Robert P., Jr.; and Steece, William H., 4,873,762, Cl. 29-809.000.

Ameron, Inc.: *See*—
Hajovsky, Robert J., 4,874,548, Cl. 252-511.000.

Amoco Corporation: *See*—
Joseph, Earl M.; Pritchard, Robert J.; and Sufi, Arshad H., 4,874,043, Cl. 166-272.000.

AMP Incorporated: *See*—
Bakermans, Johannes C. W., 4,874,338, Cl. 439-851.000.
Bowen, Terry P.; Harms, Sherry J.; and Hoffer, John C., 4,874,218, Cl. 350-96.200.
Dola, Frank P.; Feldman, Steven; and Erwin, John K., 4,874,322, Cl. 439-210.000.
Korsunsky, Iosif; Foreman, Gerald L.; and Bateman, Steven P., 4,873,761, Cl. 29-741.000.
Marsh, Edward K., 4,874,336, Cl. 439-607.000.
Paukovits, Edward J., Jr.; and Wright, Susan E., 4,874,337, Cl. 439-609.000.
Reed, Carl G., 4,874,333, Cl. 439-514.000.
Werner, Walter M., 4,873,765, Cl. 29-876.000.

Andersen, James K.; and Hikes, Carl L., to Westinghouse Electric Corp. Underwater electrical connector. 4,874,324, Cl. 439-271.000.

Anderson, Dean H.; and Tomann, Mark M., to Hudson Valley Metal Works, Inc. Adjustable orientation apparatus with simultaneous adjustment of polar and declination angles. 4,875,052, Cl. 343-882.000.

Anderson, Orin M.: *See*—
Ryan, Thomas W., III; Maymar, Milan J.; and Anderson, Orin M., 4,873,947, Cl. 123-78.00C.

Ando, Katsutoshi; and Ogawa, Yo, to Toray Industries. Electret fiber sheet and method of producing same. 4,874,659, Cl. 428-221.000.

Ando, Masamoto: *See*—
Nishii, Michiharu; Ando, Masamoto; and Tada, Yoshihiko, 4,874,207, Cl. 303-52.000.

Ando, Takao: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,874,750, Cl. 514-42.000.

Ando, Yashiko; Noda, Yasushi; and Abe, Yohji, to Teac Corporation. Head loading mechanism for flexible disc drive. 4,875,119, Cl. 360-105.000.

Andra, Rainer; Kurr, Klaus; Ullrich, Gunter; and Dorge, Udo, to Carl Freudenberg, Firma. Torsion-vibration damper. 4,873,887, Cl. 74-573.00F.

Andre, Venant, to Renault Vehicules Industriels. Mechanical transmission manual control device. 4,873,883, Cl. 74-473.00R.

Andrews, Richard J.: *See*—
Greeves, Godfrey; Potter, James C.; Andrews, Richard J.; and Harris, Kenneth M., 4,874,301, Cl. 417-462.000.

Andrews, Rodger F.: *See*—
Tack, Robert D.; Andrews, Rodger F.; and Ayres, Sally J., 4,874,394, Cl. 44-70.000.

Andrews, William H.; Brothers, Virginia M.; Files, James G.; Kuhn, Irene; McCaman, Michael T.; Paul, Leland S.; Sias, Stacey R.; Gore, Thomas C.; Newman, Karel Z., Jr.; and Tedesco, John L., to Solvay & Cie, S.A. DNA encoding an antigenic protein derived from *Eimeria tenella* and vaccines for prevention of coccidiosis caused by *Eimeria tenella*. 4,874,705, Cl. 435-252.330.

Andros, Andrew A.; Campana, Thomas J., Jr.; Thelen, Gary F.; and Kinast, Robert A., to Telefind Corp. Paging system with transmission protocol compatible with analog and digital transmitters. 4,875,039, Cl. 340-825.440.

Anger, Wilhelm; and Leuzinger, Christoph, to Eyemetrics-Systems AG. Device for determining the forces in the area of the contact surfaces between a spectacle frame and the head of the wearer. 4,873,994, Cl. 128-774.000.

Anthony P. Palett: *See*—
Palett, Anthony P.; and Spear Jr., A. Gil, 4,875,229, Cl. 379-58.000.

Antoni, Patricia A.; Nolan, Timothy J.; Hayes, Thomas J.; Arneson, Theodore R.; and Coleman, Jerry E., to Packaging Corporation of America. Serving tray and cover therefor. 4,874,083, Cl. 206-45.320.

Antoniades, Harry N.; and Lynch, Samuel E., to Institute of Molecular Biology, Inc.; and President and Fellows of Harvard College. Wound headling composition of TGF-alpha and PDGF. 4,874,746, Cl. 514-21.000.

Antonov, Alexandr A.: *See*—
Petrov, Vyacheslav V.; Gorshkov, Nikolai V.; Antonov, Alexandr A.; Tokar, Alexandr P.; Krjuchin, Andrei A.; and Shanoilo, Semen M., 4,875,204, Cl. 369-100.000.

Anvil Cases, Inc.: *See*—
Thompson, Marvin W.; Jennings, Timothy C.; Scott, James A.; Phenicie, Ronald W.; Murphy, Margaret H.; Nakash, Gabriel D.; Biggers, James R.; Boudreau, Lynnlee M.; and Curiel Contreras, Jorge H., 4,874,266, Cl. 403-407.100.

Aoki, Hideo: *See*—
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.

Aoki, Kazuo; and Tachibana, Sadao, to Oki Electric Industry Co., Ltd. Luminous element holding structure for an illuminated key switch. 4,874,913, Cl. 200-314.000.

Aoki, Riichirou: *See*—
Egawa, Hidemitsu; Aoki, Riichirou; and Okumura, Katsuya, 4,875,088, Cl. 357-67.000.

Aoki, Takatoshi: *See*—
Fujiyoshi, Yoshihiro; Aoki, Takatoshi; and Urata, Yasuhiro, 4,873,949, Cl. 123-90.120.

Aono, Toshiaki: *See*—
Matsui, Masataka; Aono, Toshiaki; Tanimoto, Yoshio; Nakahama, Tadamitsu; and Yamane, Takakazu, 4,874,639, Cl. 427-240.000.

Aono, Yasuhiro, to Nikon Corporation. Zoom lens. 4,874,231, Cl. 350-427.000.

Aoyagi, Osamu: *See*—
Sato, Masahiko; Konuma, Toshimitsu; Odaka, Seiichi; Yamaguchi, Toshiharu; Watanabe, Toshio; Aoyagi, Osamu; Tabata, Kaoru; Isigaki, Chizuru; Sakayori, Hiroyuki; Kobayashi, Ippei; Osabe, Akio; and Yamazaki, Shunpei, 4,874,461, Cl. 156-633.000.

Applause, Inc.: *See*—
Chiavetta, Sebastiano R.; and De Guglielmi, Giorgio, 4,874,163, Cl. 272-53.200.

Apple Computer, Inc.: *See*—
Ashkin, Peter B.; and Clark, Michael, 4,875,158, Cl. 364-200.000.

Applied Micro Circuits Corporation: *See*—
Coy, Bruce H.; and Yuen, Raymond C., 4,874,970, Cl. 307-475.000.

Apricot S.A.: *See*—
Lo, Shui-Yin, 4,875,213, Cl. 372-5.000.

APTI, Inc.: *See*—
Lowther, Frank E., 4,873,928, Cl. 102-323.000.

Arant, Gene W.: *See*—
Gotman, Alexander S., 4,874,275, Cl. 411-5.000.

Arasmith, Stanley. Wood processing device having self-reversing feature. 4,874,024, Cl. 144-174.000.

Arata, Tadao, to Tanashin Denki Co., Ltd. Automatic stopping device for a tape feeding apparatus. 4,875,113, Cl. 360-74.200.

Archer, David, to Davru Manufacturing Ltd. X-ray gantry. 4,875,228, Cl. 378-197.000.

Archer, Timothy H. V.; Bowman, Randy; and Glenn, Michael I., to Burlington Industries, Inc. Clean air hood for fluid jet printing. 4,875,054, Cl. 346-1.100.

Arefinejad, Majid; Brothers, Dennis J.; and Kosinski, Frederick, to Semec, Inc. Recliner assembly for vehicle seat. 4,874,205, Cl. 297-379.000.

Arena Recreations (Toronto) Limited: *See*—
Armstrong, Richard J.; and Granzotto, Robert, 4,874,143, Cl. 242-198.000.

Arenberg, I. Kaufman: *See*—
Miller, Curtis H.; Arenberg, I. Kaufman; and Altshuler, John H., 4,874,368, Cl. 604-82.000.

Argiriadis, Nikos. Mechanism for separating the closed pistachio nuts from the open pistachio nuts of aegina and rotten legumes. 4,874,097, Cl. 209-616.000.

Ariav, Arie, to I.D. Tech Ltd. Intrusion detection apparatus. 4,875,198, Cl. 367-93.000.

Aritech Corporation: *See*—
Guscott, John K.; Stelmack, Gerard G.; and Boulos, Charles A., 4,875,029, Cl. 340-567.000.

Arlt, Dieter; Schwartz, Ulrich; Brandt, Hans-Walter; Arlt, Wolfgang; and Nickel, Andreas, to Bayer Aktiengesellschaft. Separation of diastereomers by extractive distillation. 4,874,473, Cl. 203-1.000.

Arlt, Wolfgang: *See*—
Arlt, Dieter; Schwartz, Ulrich; Brandt, Hans-Walter; Arlt, Wolfgang; and Nickel, Andreas, 4,874,473, Cl. 203-1.000.

Armco Inc.: *See*—
Niedringhaus, Joyce C.; and Lowry, Michael L., 4,874,428, Cl. 75-30.000.

Armstrong, Donald L.: *See*—
Frenkel, Robert L.; Derks, Christopher S.; and Armstrong, Donald L., 4,874,079, Cl. 198-436.000.

Armstrong, Richard J.; and Granzotto, Robert, to Arena Recreations (Toronto) Limited; and Heisey, William L. Tape cassette having rewind control mechanism. 4,874,143, Cl. 242-198.000.

Armstrong Rubber Co., The: *See*—
Ginter, David J., 4,874,455, Cl. 156-397.000.

Arnau-Munoz, Jose L.; and Cornette, Henri, to Procter & Gamble Company, The. Multiple compartment container. 4,874,107, Cl. 220-20.000.

Arnaud, Rene; Gardette, Jean-Luc; and Lamaire, Jacques, to Universite De Clermont II, Laboratoire De Photochimie. Device for accelerated photo-aging of materials containing polymers. 4,874,952, Cl. 250-455.100.

Arneson, Theodore R.: *See*—
Antoni, Patricia A.; Nolan, Timothy J.; Hayes, Thomas J.; Arneson, Theodore R.; and Coleman, Jerry E., 4,874,083, Cl. 206-45.320.

Arnett, Daniel W. Spare tire lock for truck-trailer wheels. 4,873,851, Cl. 70-259.000.

Arnold, Alvin: *See*—
Shivers, Charles C.; and Arnold, Alvin, 4,873,819, Cl. 56-17.500.

Arnold, Jimmie D. Self-propelled trench shoring machine. 4,874,271, Cl. 405-283.000.

Arnold, Vladimir: *See*—
Oxenius, Rudiger; Burgi, Ernst; Arnold, Vladimir; and Rakoczi, Ferenc, 4,874,847, Cl. 534-565.000.

Arnott, John; and Kaga, Gary, to Ontario Limited. Napkin holder. 4,874,099, Cl. 211-50.000.

Arns, Christopher L.: *See*—
Frederick, Warren P.; Steele, Sarah L.; Rhodes, David D.; and Arns, Christopher L., 4,874,365, Cl. 604-54.000.

Arroyo, Candido J.; and Patel, Parbhubhai D., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Animal-resistant cable. 4,874,219, Cl. 350-96.230.

Artos Engineering Company: *See*—
Stoehr, Herbert M., 4,873,901, Cl. 81-9.510.

Arzheimittel GmbH Apotheker Vetter & Co. Ravensburg: *See*—
Vetter, Udo J., 4,874,381, Cl. 604-191.000.

Asada, Seiichi; Sueyoshi, Toshinobu; and Miyake, Akira, to Hitachi Maxell, Ltd. Magnetic powder and magnetic recording medium comprising the same. 4,874,668, Cl. 428-403.000.

Asahi Denka Kogyo Kabushiki Kaisha: *See*—
Maruzeni, Shoji; Matsumoto, Wataru; and Yasuda, Nozomi, 4,874,699, Cl. 435-135.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Yamagata, Masakazu, 4,874,220, Cl. 350-96.260.

Asaida, Takashi: *See*—
Yamamoto, Isamu; and Asaida, Takashi, 4,875,098, Cl. 358-213.160.

Asano, Hiroaki; Tsujiuchi, Toshio; Yoneda, Takao; Ishihara, Nobuhiro; Maruyama, Toshio; and Ohta, Norio, to Toyoda-Koki Kabushiki-Kaisha. Numerically controlled machine tool. 4,873,793, Cl. 51-165.710.

Asano, Kazuo: *See*—
Masuda, Koji; Suemitsu, Yuji; and Asano, Kazuo, 4,875,060, Cl. 346-155.000.

Asayama, Yoshiaki: *See*—
Ueyama, Yoshiji; and Asayama, Yoshiaki, 4,873,957, Cl. 123-399.000.

Asea Brown Boveri AB: *See*—
Sobel, Jarl, 4,873,874, Cl. 73-862.360.

Ashe, Bonnie M.; and Fletcher, Daniel S., to Merck & Co., Inc. Anti-inflammatory and antidegenrative compounds isolated from L-681,512. 4,874,755, Cl. 514-179.000.

Ashkin, Peter B.; and Clark, Michael, to Apple Computer, Inc. Method for requesting service by a device which generates a service request signal successively until it is serviced. 4,875,158, Cl. 364-200.000.

Asphalt Materials, Inc.: *See*—
Kriech, Anthony J.; and Wissel, Herbert L., 4,874,432, Cl. 106-273.100.

Astromed Limited: *See*—
Mackay, Craig D., 4,874,492, Cl. 204-182.800.

AT&T Bell Laboratories: *See*—
Koze, Jeffrey T.; and Miller, Anton J., 4,874,463, Cl. 156-645.000.

Ataka, Kikuo: *See*—
Hamasaki, Naotaka; Kawamura, Hirotaka; Ohtsu, Norio; Nakakoshi, Ichiro; Ataka, Kikuo; Oomori, Kiyosi; and Kouno, Masahiko, 4,874,882, Cl. 558-131.000.

Atlas, George N.; Donnally, Leroy C.; Urban, Donald P.; Perkins, James M.; and Wilson, Timothy C. Vacuum assisted transfer mold and vent pin. 4,874,308, Cl. 425-544.000.

Atsuta, Toshikatsu: *See*—
Kubodera, Takayuki; Nakamura, Shizuo; Onizawa, Masanori; Shiroshita, Hirotaka; Mochizuki, Eiichi; Tsujimura, Masao; Atsuta, Toshikatsu; and Morooka, Takayoshi, 4,875,065, Cl. 354-82.000.

Auchus, Ricahrd J.: *See*—
Covey, Douglas F.; and Auchus, Ricahrd J., 4,874,891, Cl. 560-256.000.

Auer, Robert T., to Buddy L. Corporation. Delayed action flashlight. 4,875,147, Cl. 362-205.000.

Auerbach, Seymour. Three-dimensional puzzle. 4,874,176, Cl. 273-157.00R.

Auergesellschaft GmbH: *See*—
Freidank, Michael; Coym, Jurgen; and Schubert, Axel, 4,873,970, Cl. 128-202.220.

Auping B.V.: *See*—
Savenije, Franciscus G., 4,873,737, Cl. 5-453.000.

Ausimont S.r.l.: *See*—
Navarrini, Walter; and Desmarteu, Darryl D., 4,874,875, Cl. 548-959.000.

Ausimont S.p.A.: *See*—
Johns, Ken; Re, Alberto; and Bargigia, Gianangelo, 4,874,842, Cl. 528-494.000.

Australian Electro Optics Pty. Ltd.: *See*—
Hughes, John L., 4,875,215, Cl. 372-6.000.

Austria Metall Aktiengesellschaft: *See*—
Bertha, Josef, 4,874,429, Cl. 75-118.00R.

Avakian, Roger W.: *See*—
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,874,783, Cl. 524-482.000.

Avant, Odis L.; and Crawford, Duane A., to Avant, Odis L. Stapling method and apparatus for vesicle-urethral re-anastomosis following retropubic prostatectomy and other tubular anastomosis. 4,873,977, Cl. 128-334.00R.

Avery, Bennett W.; and Engel, William K., to Caterpillar Inc. Balanced free-planet drive mechanism. 4,873,894, Cl. 74-785.000.

AVK Filtertechnik GmbH: *See*—
Esch, Hans W., 4,874,517, Cl. 210-493.500.

Ayres, Sally J.: *See*—
Tack, Robert D.; Andrews, Rodger F.; and Ayres, Sally J., 4,874,394, Cl. 44-70.000.

B.A.T. Cigarettenfabriken GmbH: *See*—
Borowski, Horst; Kausch, Erwin; Rittershaus, Erhard; Rudolph, Gert; and Schneider, Werner, 4,874,004, Cl. 131-364.000.

B. F. Goodrich Company, The: *See*—
Cinadr, Bernard F., 4,874,823, Cl. 525-329.200.
Magistro, Angelo J., 4,874,858, Cl. 544-196.000.
Rundo, John R., 4,873,803, Cl. 52-202.000.

B.R.I.C.-Bureau de Recherche pour l' Innovation et la Convergence & Banque de France: *See*—
Gravisse, Philippe; Duchateau, Jacques; and Perron, Maurice, 4,874,188, Cl. 283-89.000.

Baba, Masatoshi: *See*—
Ogura, Tomoyuki; Kawamura, Yasuo; Ishii, Shigeru; Baba, Masatoshi; Taniguchi, Masakazu; Hirose, Masayoshi; Hirata, Kiminori; and Ochiai, Yoshinori, 4,874,861, Cl. 544-229.000.

Baba, Shiro, to Hitachi, Ltd. Semiconductor integrated circuit device having a wiring layout to avoid intersecting between analog signal wiring layers and digital signal wiring layers. 4,875,047, Cl. 341-155.000.

Babcock & Wilcox Company, The: *See*—
Fry, John J.; Robertson, John W., Jr.; and Bastijanic, Edward, 4,875,000, Cl. 318-798.000.

Back, Gerhard; and Beffa, Fabio, to Ciba-Geigy Corporation. Asymmetrical polyazo chromium complex dyes comprising resorcinol as a coupling component. 4,874,848, Cl. 534-684.000.

Back, Gerhard; Beffa, Fabio; Schlesinger, Ulrich; and Puntener, Alois, to Ciba-Geigy Corporation. Asymmetric 1:2-chromium complex dyes containing two azo dyes, one containing an acetoacetanilide coupling component. 4,874,849, Cl. 534-696.000.

Baer, Ralph H.; Curran, Kenneth J.; and Smith, Jay, III, to Smith Engineering. Encoding of audio and digital signals in a video signal. 4,875,096, Cl. 358-143.000.

Bahr, Christian: *See*—
Heppke, Gerd; Scherowsky, Gunter; Bahr, Christian; and Lehmann, Lutz, 4,874,545, Cl. 252-299.610.

Bahr, Dennis E.: *See*—
Monson, Mark B.; Blandino, Thomas P.; Bahr, Dennis E.; and Post, Kendall E., 4,875,019, Cl. 330-302.000.

Bahr Technologies, Inc.: *See*—
Monson, Mark B.; Blandino, Thomas P.; Bahr, Dennis E.; and Post, Kendall E., 4,875,019, Cl. 330-302.000.

Bai, Monty W.; and Huhmann, Douglas J., to Motorola, Inc. Mechanical field effect transistor sensor. 4,873,871, Cl. 73-777.000.

Baines, Patrick A., to Venture Packaging, Inc. Bag with carrying handle for containing merchandise. 4,874,256, Cl. 383-21.000.

Baker Cummins Pharmaceuticals, Inc.: *See*—
Hsiao, Charles, 4,874,613, Cl. 424-458.000.

Baker, David S.: *See*—
Lauritzen, Ann M.; Baker, David S.; Christiansen, Margot H.; Johnson, Beamon M.; and Schuren, John G., 4,874,879, Cl. 549-536.000.

Baker, Patrick J., to Eli Lilly and Company. Chromatographic purification process. 4,874,843, Cl. 530-317.000.

Baker, Rodney C., to AECI Limited. Insecticidal composition. 4,874,753, Cl. 514-89.000.

Bakermans, Johannes C. W., to AMP Incorporated. Receptacle box terminal with improved contact area. 4,874,338, Cl. 439-851.000.

Ball, James R.; and Barnard, Delbert J., to Cello Bag Company, Inc. Top gusset bag with integral handle. 4,874,255, Cl. 383-8.000.

Bandiera, Angelo: *See*—
Teillauchet, Eric; and Bandiera, Angelo, 4,873,885, Cl. 74-520.000.

Bankhamer, Vinzenz; and Zeman, Gerhard, to Advanced Explosives Gesellschaft b.R. Explosive for warheads and solid rocket propellant. 4,874,441, Cl. 149-42.000.

Bansal, Madan L.; and Byrd, William A., to Sundstrand Corporation. Magnetic isolation and cooling system in dynamoelectric machines. 4,874,972, Cl. 310-57.000.

Bao, Yongde: *See*—
Chang, Stephen S.; Bao, Yongde; and Pelura, Timothy J., 4,874,629, Cl. 426-601.000.

Bardini, Armando J. Chimney cleaning device. 4,873,739, Cl. 15-242.000.

Bargigia, Gianangelo: *See*—
Johns, Ken; Re, Alberto; and Bargigia, Gianangelo, 4,874,842, Cl. 528-494.000.

Barker, W. David: *See*—
Heisey, Raymond K., Jr.; Barker, W. David; Mariano, Arturo C.; and Thurnau, Vernon L., 4,873,808, Cl. 52-478.000.

Barlow, Sandra K.: *See*—
Davis, Robert B.; Kramer, Charles E.; and Barlow, Sandra K., 4,874,660, Cl. 428-234.000.

Barnard, Delbert J.: *See*—
Ball, James R.; and Barnard, Delbert J., 4,874,255, Cl. 383-8.000.

Baron, Arthur L.; Myers, Terry N.; and Wicher, Jerome, to Pennwalt Corporation. Dianhydride coupled polymer stabilizers. 4,874,803, Cl. 524-94.000.

Barr, John D.: *See*—
Taylor, Malcolm R.; Barr, John D.; and Smart, John R., 4,873,895, Cl. 76-108.00A.

Barr, Maurice R.: *See*—
Henley, Francois G.; Choi, Hee-June; Kratzer, Dean J.; and Barr, Maurice R., 4,875,006, Cl. 324-158.00R.

Barry, David W.: *See*—
Rideout, Janet L.; Barry, David W.; Lehrman, Sandra N.; St. Clair, Martha H.; and Furman, Phillip A., 4,874,609, Cl. 424-85.400.

Bartilucci, Mark P.; Karsner, Grant G.; and Tracy, William J., III, to Mobil Oil Corporation. Recycle of oily refinery wastes. 4,874,505, Cl. 208-131.000.

BASF Aktiengesellschaft: *See*—
Cooper, Bryan, 4,874,701, Cl. 435-147.000.
Fischer, Rolf; Merger, Franz; and Gosch, Hans-Juergen, 4,874,889, Cl. 560-205.000.
Hoelderich, Wolfgang; Hupfer, Leopold; and Schneider, Kurt, 4,874,899, Cl. 568-386.000.
Wambach, Ludwig; and Fischer, Martin, 4,874,865, Cl. 546-243.000.

BASF Structural Materials Inc.: *See*—
McMahon, Paul; Chung, Tai-Shung; and Ying, Lincoln, 4,874,563, Cl. 264-29.200.

Bastijanic, Edward: *See*—
Fry, John J.; Robertson, John W., Jr.; and Bastijanic, Edward, 4,875,000, Cl. 318-798.000.

Bateman, Steven P.: *See*—
Korsunsky, Iosif; Foreman, Gerald L.; and Bateman, Steven P., 4,873,761, Cl. 29-741.000.

Bates, Howard M., to CALPAC Incorporated. Folding corrugated board carton. 4,874,125, Cl. 229-132.000.

Bates, Mitchell G. Hidden hook artificial lure. 4,873,781, Cl. 43-35.000.

Batilteu, Francois: *See*—
Pierre, Andre; Batilteu, Francois; Brosselard, Jean-Pierre; Permuy, Alfred; Pirot, Francois-Xavier; and Spirkovitch, Serge, 4,873,868, Cl. 73-517.00R.

Battelle Development Corporation: *See*—
Lee, Siu-Leung, 4,874,520, Cl. 210-635.000.

Batterman, Eric P.: *See*—
Chandler, Donald G.; Batterman, Eric P.; and Shah, Govind, 4,874,936, Cl. 235-494.000.

Baumgarten, Robert W.: *See*—
Walker, Raymond M.; Achor, Donald P.; Baumgarten, Robert W.; and Bogard, Ralph B., 4,873,751, Cl. 29-156.80B.

Baxter Internatiional Inc.: *See*—
Zdeb, Brian; Pearson, Steve; and Slater, Glenn L., 4,874,366, Cl. 604-56.000.

Baxter International Inc.: *See*—
Frederick, Warren P.; Steele, Sarah L.; Rhodes, David D.; and Arna, Christopher L., 4,874,365, Cl. 604-54.000.
Kulle, Lee; Desecki, Vince; and Hess, John M, III, 4,874,369, Cl. 604-86.000.
Sutherland, Karl M.; and Jenusaitia, Matthew, 4,874,581, Cl. 422-46.000.

Bayer Aktiengesellschaft: *See*—
Arlt, Dieter; Schwartz, Ulrich; Brandt, Hans-Walter; Arlt, Wolfgang; and Nickel, Andreas, 4,874,473, Cl. 203-1.000.
Dujardin, Ralf; Ebert, Wolfgang; Meyer, Rolf-Volker; Berg, Klaus; Grigo, Ulrich; and Wehnert, Wolfgang, 4,874,816, Cl. 525-146.000.
Gallenkamp, Bernd; Gunther, Andreas; Mohrmann, Karl-Heinrich; and Schmidt, Thomas, 4,874,860, Cl. 544-221.000.
Haas, Peter; Sommerfeld, Claus-Dieter; and Weber, Hans-Ulrich, 4,874,797, Cl. 521-167.000.
Hammerschmidt, Erich; and Blank, Heinz U., 4,874,892, Cl. 562-409.000.
Harms, Wolfgang, 4,874,857, Cl. 544-75.000.
Jabs, Gert; and Richartz, Adolf, 4,874,832, Cl. 528-60.000.
Jelich, Klaus; Gayer, Herbert; Kramer, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,874,424, Cl. 71-105.000.
Kule, Engelbert; and Adler, Alfons, 4,874,874, Cl. 548-544.000.
Wroblowsky, Heinz-Jurgen; Kluth, Joachim; Tietjen, Klaus-Gunther; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,874,420, Cl. 71-93.000.

Bayne, Irman D., to Medical Dynamics, Inc. Cervical cytology device. 4,873,992, Cl. 128-756.000.

Beach, Kerry B.: *See*—
Harsch, Curtis L.; and Beach, Kerry B., 4,875,176, Cl. 364-557.000.

Beacham, Lowrie M., III; LeBlanc, Harry S.; and Freeman, George A., to Burroughs Wellcome Co. Antibacterial treatment. 4,874,751, Cl. 514-50.000.

Beall, Gary W.: *See*—
Eilliott, Donald R.; and Beall, Gary W., 4,874,728, Cl. 501-148.000.

Beall, George H.; Pierson, Joseph E.; and Quinn, Candace J., to Corning Incorporated. Alkali zinc aluminophosphate glass-ceramics. 4,874,724, Cl. 501-10.000.

Beam, Don E.: *See*—
Lyons, Dale R.; and Beam, Don E., 4,873,850, Cl. 70-85.000.

Bean, Kenneth E.: *See*—
Malhi, Satwinder D. S.; Shen, Chi-Cheong; Bean, Kenneth E.; and Chang, Peng-Heng, 4,875,086, Cl. 357-54.000.

Beard, Steven A.: *See*—
Lopez, Benjamin L.; Beard, Steven A.; and Phillips, Kirby, 4,874,299, Cl. 417-413.000.

Beaton, Robert J.: *See*—
McManus, Paul A.; and Beaton, Robert J., 4,875,032, Cl. 340-703.000.

Becker, Paul, to Raychem Corporation. Stabilization of poly(arylene ether ketones). 4,874,840, Cl. 528-480.000.

Becker, Wallace E., to Abbott Laboratories. Pharmaceutical tableting method. 4,874,614, Cl. 424-465.000.

Becker, William. Corrugated cardboard heat exchanger. 4,874,042, Cl. 165-166.000.

Becton Dickinson and Company: *See*—
Piran, Uri, 4,874,710, Cl. 436-518.000.

Bednarz, George A.; Smith, Reginald W.; Roeding, Gretchen W.; and Test, Howard R., to Texas Instruments Incorporated. Process of packaging a semiconductor device with reduced stress forces. 4,874,722, Cl. 437-209.000.

Beer, Robin F. C. Chariot type golf cart. 4,874,055, Cl. 180-19.200.

Beffa, Fabic: *See*—
Back, Gerhard; Beffa, Fabic; Schlesinger, Ulrich; and Puntener, Alois, 4,874,849, Cl. 534-696.000.

Beffa, Fabio: *See*—
Back, Gerhard; and Beffa, Fabio, 4,874,848, Cl. 534-684.000.

Behe, Anthony J.: *See*—
Urban, Joseph J., Jr.; Henderson, Norman; and Behe, Anthony J., 4,874,605, Cl. 424-78.000.

Behlen, Horst: *See*—
Ziegler, Horst; and Behlen, Horst, 4,874,252, Cl. 374-117.000.

Beiersdorf Aktiengesellschaft: *See*—
Heimerl, Albert; Brammer, Hans-Adolf; and Hofeditz, Wolfgang, 4,874,370, Cl. 604-93.000.

Beirens, Leopold C. M.: *See*—
Overdijk, Dik R.; Bolder, Antonius J. J.; Beirens, Leopold C. M.; and Van Rens, Piet C. J., 4,874,982, Cl. 313-440.000.

Bekedam, Martin. Jet spray atmospheric deaerator. 4,874,406, Cl. 55-198.000.

Bell Communications Research, Inc.: *See*—
Alspector, Joshua, 4,874,963, Cl. 307-201.000.

Bell, Malcolm R.: *See*—
D'Ambra, Thomas E.; and Bell, Malcolm R., 4,874,761, Cl. 514-235.200.

Beloit Corporation: *See*—
Pulkowski, Jeffrey H.; Macklem, Elizabeth A.; and Busker, L. H., 4,874,469, Cl. 162-359.000.
Skaugen, Borgeir, 4,874,470, Cl. 162-360.100.

Benaroya, Henry. Energy producing installation with internal combustion engine and turbine. 4,873,822, Cl. 60-39.750.

Bennett, Brian S.; and Smith, David, to Clifford & Snell Limited. Float-free arrangement for marine radio distress beacons. 4,873,933, Cl. 441-36.000.

Bensing, Gregory L.; Gladd, Joseph H.; and Yurtin, John A., to General Motors Corporation. Electrical connector with interface seal. 4,874,325, Cl. 439-272.000.

Benson, David J.; and Burroughs, James A., to Honeywell Inc. Closed loop adaptive raster deflection signal generator. 4,874,992, Cl. 315-387.000.

Bentley, Andrew C.: *See*—
Newman, Alec T.; Bentley, Andrew C.; King, Christine A.; MacMahon, Alistair J.; Tansley, Robert W.; and Gibbs, Andrew R., 4,873,915, Cl. 99-289.00R.

Berdahl, Donald R., to General Electric Company. Polyetherimides and precursors therefor from oxydiphtalic anhydride diester and a mixture of diamines. 4,874,835, Cl. 528-179.000.

Berg, Klaus: *See*—
Dujardin, Ralf; Ebert, Wolfgang; Meyer, Rolf-Volker; Berg, Klaus; Grigo, Ulrich; and Wehnert, Wolfgang, 4,874,816, Cl. 525-146.000.

Berger, Herbert: *See*—
Mertens, Alfred; von der Saal, Wolfgang; Berger, Herbert; Muller-Beckmann, Bernd; and Strein, Klaus, 4,874,756, Cl. 514-212.000.

Bergerioux, Jean-Marcel; Pavie, Claude; and Plent, Christian, to Societe Anonyme dite: Compagnie Generale D'Automatisme CGA-HBS. Method of making up batches of small items, and an installation implementing the method. 4,874,281, Cl. 414-285.000.

Bergk, Gunther, to Braun Aktiengesellschaft. Electronic switching power supply with a choke converter. 4,875,001, Cl. 323-223.000.

Bergstrom, Hans R., to Car-O-Liner Company. Lifting arrangement in vehicle chassis straightening benches. 4,873,861, Cl. 72-457.000.

Berlanga, Jose M. C.: *See*—
Brana, Miguel F.; Berlanga, Jose M. C.; Keilhauer, Gerhard; and Schlick, Erich, 4,874,863, Cl. 540-99.000.

Berman, Jody R.: *See*—
Larson, Paul A.; Aldrich, Dale J.; and Berman, Jody R., 4,874,669, Cl. 428-416.000.

Bernard Matthews plc: *See*—
Matthews, Bernard T.; Joll, David J.; and Ziauddin, Habeeb M., 4,874,623, Cl. 426-272.000.

Bernardon, Jean-Michel: *See*—
Shroot, Braham; Eustache, Jacques; Bernardon, Jean-Michel; and Nedoncelle, Philippe, 4,874,747, Cl. 514-23.000.

Berry, Mark D.; Tan, Robert J.; and Garver, Robert V., to United States of America, Army. High power microwave expander for producing fast rise time pulses. 4,875,022, Cl. 333-20.000.

Bershas, James P.; and Tobias, Russell H., to Owens-Corning Fiberglas Corporation. Aminated hydroxylated polyester polyol resin and molding compositions comprised thereof. 4,874,837, Cl. 528-291.000.

Bertha, Josef, to Austria Metall Aktiengesellschaft. Hydrometallurgical process for the recovery of silver from copper electrolysis anode sludge. 4,874,429, Cl. 75-118.00R.

Bertsch, Peter: *See*—
Pruitt, Gerald R.; and Bertsch, Peter, 4,873,913, Cl. 92-158.000.

Berzon, Evgeny J.: *See*—
Minuhin, Vadim B.; Berzon, Evgeny J.; and VonDeylen, Vernon F., 4,875,108, Cl. 360-51.000.

Best Lock Corporation: *See*—
Foshee, William R., 4,873,853, Cl. 70-452.000.

Bezard, Jean-Jacques; Feppon, Philippe; and Rodionoff, Pierre, to Jaeger. Device for detection of extraneous substances through a wall and a system for aiding the driving of automobiles or airplanes. 4,874,242, Cl. 356-341.000.

Bickelhaupt, Friedrich; and van der Does, Thomas, to Shell Oil Company. Bisphosphine production. 4,874,897, Cl. 568-13.000.

Biederman, David L.: *See*—
Roberts, Auston K.; Trainer, William E.; and Biederman, David L., 4,874,593, Cl. 423-322.000.

Biggers, James R.: *See*—
Thompson, Marvin W.; Jennings, Timothy C.; Scott, James A.; Phenicie, Ronald W.; Murphy, Margaret H.; Nakash, Gabriel D.; Biggers, James R.; Boudreau, Lynnlee M.; and Curiel Contreras, Jorge H., 4,874,266, Cl. 403-407.100.

Bigus, Stephen J.: *See*—
Oldham, Susan L.; Elias, William E.; Bigus, Stephen J.; and Lau, Kreisler S. Y., 4,874,643, Cl. 427-340.000.

Bilco Company, The: *See*—
Lyons, Robert, Sr., 4,873,791, Cl. 49-386.000.

Billington, Donald G.: *See*—
Gordon, Alan J.; and Billington, Donald G., 4,874,582, Cl. 422-102.000.

Binder, John J.; and Kaiser, Thomas A., to Nordson Corporation. Method and apparatus for spraying powder into a continuous tow. 4,873,937, Cl. 118-44.000.

Bio-Rad Laboratories, Inc.: *See*—
Hochstrasser, Denis F., 4,874,490, Cl. 204-182.100.

Biogen, Inc.: *See*—
Fiers, Walter C.; and Remaut, Rene Erik, 4,874,702, Cl. 435-172.000.
Wallner, Barbara P.; Pepinsky, R. Blake; and Garwin, Jeffrey L., 4,874,743, Cl. 514-12.000.

Biomaterials Universe, Inc.: *See*—
Hyon, Suong-Hyu; and Ikada, Yoshito, 4,874,562, Cl. 264-1.400.

Biondi, Luigi: *See*—
Furno, Franco; and Biondi, Luigi, 4,875,035, Cl. 340-731.000.

Bisaiji, Takashi; Sawayama, Noboru; and Yoo, Hideo, to Ricoh Company, Ltd. Toner density control for multicolor electrophotographic copier. 4,875,079, Cl. 355-246.000.

Bischof, Klaudia: *See*—
Uphues, Guenter; Ploog, Uwe; and Bischof, Klaudia, 4,874,883, Cl. 558-150.000.

Bishop, Robert P.; Sabetti, Anthony J.; and Charboneau, Thomas, to Texas Instruments Incorporated. Pressure sensor. 4,875,135, Cl. 361-283.000.

Blackler, John: *See*—
Roberts, Bryan W.; Fien, Alan R.; and Blackler, John, 4,874,291, Cl. 416-122.000.

Blaese, Herbert R. Antenna with impedance matching member. 4,875,051, Cl. 343-715.000.

Blair, Kevin B., to GTE Mobilnet Incorporated. Cellular telephone unit having multiple memory location command language. 4,875,230, Cl. 379-63.000.

Blakemore, John H. Infinitely variable positive mechanical transmissions. 4,873,893, Cl. 74-752.00B.

Blaker, James L.: *See*—
McPherson, Walter K.; and Blaker, James L., 4,873,867, Cl. 73-493.000.

Blandino, Thomas P.: *See*—
Monson, Mark B.; Blandino, Thomas P.; Bahr, Dennis E.; and Post, Kendall E., 4,875,019, Cl. 330-302.000.

Blank, Heinz U.: *See*—
Hammerschmidt, Erich; and Blank, Heinz U., 4,874,892, Cl. 562-409.000.

Blanke, Richard H., Jr. Cushioned bag. 4,874,094, Cl. 206-522.000.

Blattler, Ernst, to KWC AG. Electrically controlled plumbing fixture of a hot and cold water dispenser. 4,873,830, Cl. 62-3.300.

Blount, Inc.: *See*—
Harfst, Michael D., 4,873,903, Cl. 83-830.000.

Blume, Carl R., Jr., to Prime Computer, Inc. Peripheral emulation apparatus. 4,875,186, Cl. 364-900.000.

Blunt, John W.: *See*—
Munro, Murray H. G.; Perry, Nigel B.; and Blunt, John W., 4,874,767, Cl. 514-278.000.

BOC, Inc.: *See*—
Halpern, Donald F.; and Robin, Mark L., 4,874,901, Cl. 568-683.000.
Huang, Chialang; and Vernice, Gerald G., 4,874,902, Cl. 568-683.000.

Bock, Eberhard, to TetraWerke Dr.rer.nat. U. Baensch GmbH. Process for producing an aqueous suspension of nitrifying bacteria. 4,874,707, Cl. 435-253.600.

Bodine, Albert G. Method and apparatus for reducing impedance or core material in sonic pile driving. 4,874,270, Cl. 405-248.000.

Boehringer Mannheim GmbH: *See*—
Mertens, Alfred; von der Saal, Wolfgang; Berger, Herbert; Muller-Beckmann, Bernd; and Strein, Klaus, 4,874,756, Cl. 514-212.000.

Bogard, Ralph B.: *See*—
Walker, Raymond M.; Achor, Donald P.; Baumgarten, Robert W.; and Bogard, Ralph B., 4,873,751, Cl. 29-156.80B.

Bogart, Mark. Method for assessing placental dysfunction. 4,874,693, Cl. 435-7.000.

Boger, Bentley J.; and Petrecca, Peter J., to Nordson Corporation. Method of forming a disposable diaper with continuous/intermittent rows of adhesive. 4,874,451, Cl. 156-291.000.

Bogese, Stephen B., II; and Hall, Charles E., to Virginia Plastics Company. Capacity modular plug. 4,874,330, Cl. 439-418.000.

Boise Cascade Corporation: *See*—
Newman, Harold L.; Adams, William S., Jr.; and Boyden, Brace, 4,874,521, Cl. 210-639.000.

Bolder, Antonius J. J.: *See*—
Overdijk, Dik R.; Bolder, Antonius J. J.; Beirens, Leopold C. M.; and Van Rens, Piet C. J., 4,874,982, Cl. 313-440.000.

Bolich, Raymond E., Jr., to Procter & Gamble Company, The. Volatile silicons. 4,874,868, Cl. 548-110.000.

Bolles, Roy E.: *See*—
White, Frederick R.; and Bolles, Roy E., 4,874,359, Cl. 604-4.000.

Boniort, Jean-Yves; and Leboucq, Jacques, to Alcatel N.V. Method of manufacturing a high mechanical strength optical fiber by drawing under high tension. 4,874,415, Cl. 65-3.110.

Bonjouklian, Rosanne; Meade, Christopher J. M.; Mihelich, Edward D.; and Phillips, Michael L., to Eli Lilly and Company. Furanone derivatives. 4,874,782, Cl. 514-473.000.

Bonneau, Edward L., III: *See*—
Greig, Donald G.; and Bonneau, Edward L., III, 4,874,627, Cl. 426-565.000.

Bono, Salvatore. Portable disinfecting device for a toilet seat and other surfaces. 4,873,728, Cl. 4-233.000.

Bonoan, Vincent J. Apparatus for playing golf from a golf cart. 4,873,964, Cl. 124-20.00R.

Boon, Wyndham; Gartland, Robert J.; and Pesata, Patrick J., Jr., to Goodyear Tire & Rubber Company, The. Tire having cured photopolymer air barrier coating. 4,874,670, Cl. 428-423.900.

Boone, Delores A. Cover for body fluid drainage bag and tubing. 4,874,387, Cl. 604-326.000.

Booth, Orville D.: *See*—
Evyan, John J.; and Booth, Orville D., 4,873,748, Cl. 17-49.000.

Borcea, Nicky; and Ionescu, Alexandru D. Gripper device. 4,874,194, Cl. 294-88.000.

Borchard, John S. Leaf spring. 4,874,051, Cl. 177-229.000.

Borchers, Jurgen; and Bubolz, Petra, to Pelikan Aktiengesellschaft. Alkaline aqueous universal adhesive containing poly(meth-)acrylate. 4,874,811, Cl. 524-516.000.

Borg-Warner Automotive, Inc.: *See*—
Butterfield, Roger P.; Neumann, Guenter J.; and Wykstra, Curt A., 4,873,879, Cl. 74-689.000.

Borland, James E.: *See*—
Smith, Kim R.; Borland, James E.; and Sauer, Joe D., 4,874,784, Cl. 514-517.000.
Smith, Kim R.; Borland, James E.; and Sauer, Joe D., 4,874,785, Cl. 514-526.000.
Smith, Kim R.; Borland, James E.; and Sauer, Joe D., 4,874,788, Cl. 514-534.000.
Smith, Kim R.; Borland, James E.; and Sauer, Joe D., 4,874,789, Cl. 514-551.000.

Bornschein, Hans-Jurgen, to F. H. Papenmeier GmbH & Co. KG. Workstation for a vision-impaired user with interface for selectively feeding display data from a bus or a connected computer. 4,875,185, Cl. 364-900.000.

Bornstein, Norman S., to Hamilton Standard Controls, Inc. Composite silver base electrical contact material. 4,874,430, Cl. 75-234.000.

Borowski, Horst; Kausch, Erwin; Rittershaus, Erhard; Rudolph, Gert; and Schneider, Werner, to B.A.T. Cigarettenfabriken GmbH. Coaxial cigarette. 4,874,004, Cl. 131-364.000.

Borretzen, Bernt; Larsen, Rolf O.; Pettersen, Erik O.; Dornish, John M.; and Oftebro, Rolf, to Norsk Hydro a.s. Anticancer compounds. 4,874,780, Cl. 514-452.000.

Borsvold, Herbert H.: *See*—
Talalay, Anselm; and Borsvold, Herbert H., 4,874,454, Cl. 156-359.000.

Boswell, Jerald O. Vacuum cleaner. 4,874,404, Cl. 55-86.000.

Boudreau, Lynnlee M.: *See*—
Thompson, Marvin W.; Jennings, Timothy C.; Scott, James A.; Phenicie, Ronald W.; Murphy, Margaret H.; Nakash, Gabriel D.; Biggers, James R.; Boudreau, Lynnlee M.; and Curiel Contreras, Jorge H., 4,874,266, Cl. 403-407.100.

Boudreaux, Donald P.; Matrozza, Mark A.; and Leverone, Marianne F., to Microlife Technics, Inc. Method for inhibiting food-borne human pathogens and preventing microbial spoilage in refrigerated foods using a Lactobacillus. 4,874,704, Cl. 435-252.900.

Boulos, Charles A.: *See*—
Guscott, John K.; Stelmack, Gerard G.; and Boulos, Charles A., 4,875,029, Cl. 340-567.000.

Boundy, Bruce K.; and Schoumaker, Raoul J. P., to Westinghouse Electric Corp. Office space dividing arrangement. 4,874,027, Cl. 160-230.000.

Bour, George: *See*—
Van Sickle, Richard G.; and Bour, George, 4,873,768, Cl. 33-178.00R.

Bouton, Marie-Madeleine: *See*—
Nique, Francois; Nedelec, Lucien; Bouton, Marie-Madeleine; and Philibert, Daniel, 4,874,754, Cl. 514-178.000.

Boutrois, Bertrand: *See*—
Haghiri, Mohammad-Reza; and Boutrois, Bertrand, 4,875,094, Cl. 358-105.000.

Bouwens, Henricus J. J.: *See*—
Koster, Marinus P.; Bouwens, Henricus J. J.; Van Tartwijk, Anton A. J.; and De Peuter, Willem L. G., 4,874,286, Cl. 414-744.500.

Bowen, Charles K.: *See*—
Carroll, Paul E.; James, Roy W., III; Bowen, Charles K.; and Smith, Gillan C., 4,875,166, Cl. 364-421.000.

Bowen, Terry P.; Harms, Sherry J.; and Hoffer, John C., to AMP Incorporated. Reversible Optical Switch. 4,874,218, Cl. 350-96.200.

Bowman, Randy: *See*—
Archer, Timothy H. V.; Bowman, Randy; and Glenn, Michael I., 4,875,054, Cl. 346-1.100.

Boxhoorn, Gosse, to Shell Oil Company. Silver-containing catalyst, process for the preparation of the catalyst and the catalyst prepared by the process. 4,874,739, Cl. 502-218.000.

Boyd, Phillip R., to United States of America, Army. High speed semiconductor characterization technique. 4,875,004, Cl. 324-158.00D.

Boyden, Brace: *See*—
Newman, Harold L.; Adams, William S., Jr.; and Boyden, Brace, 4,874,521, Cl. 210-639.000.

Boyer, John D., to Road Systems, Inc. Trailer. 4,874,184, Cl. 280-423.100.

Boyle, Peter C.; Steffen, Daniel G.; Melton, John L.; Coccodrilli, Gus D., Jr.; and Nagy, Michael A., to General Foods Corp. Rapid rehydrating beverage. 4,874,606, Cl. 426-74.000.

Boze, Ronald A.; and Warning, Theodore A. Apparatus and process for filtering fluids. 4,874,533, Cl. 210-778.000.

Bradshaw, William; and Shepard, Robert. Portable cooler. 4,873,841, Cl. 62-239.000.

Brady, Francis X.; and Kauffman, Thomas F., to National Starch and Chemical Corporation. Hot melt adhesives based on ethylene-n-butyl acrylate. 4,874,804, Cl. 524-100.000.

Brady, John F., III: *See*—
Price, John W.; and Brady, John F., III, 4,875,167, Cl. 364-424.040.

Brammer, Hans-Adolf: *See*—
Heimerl, Albert; Brammer, Hans-Adolf; and Hofeditz, Wolfgang, 4,874,370, Cl. 604-93.000.

Brana, Miguel F.; Berlanga, Jose M. C.; Keilhauer, Gerhard; and Schlick, Erich, to Knoll AG. Bisnaphthalimides. 4,874,863, Cl. 540-99.000.

Brandenburg, Ulrich: *See*—
Hager, Jorg; Ghyczy, Miklos; Feyen, Vincent; Imberge, Paul; Brandenburg, Ulrich; and Wilperath, Peter, 4,874,553, Cl. 260-403.000.

Brandon, John M.: *See*—
McCann, James D.; Young, Lawrence R.; and Brandon, John M., 4,875,055, Cl. 346-75.000.

Brandt, Hans-Walter: *See*—
Arlt, Dieter; Schwartz, Ulrich; Brandt, Hans-Walter; Arlt, Wolfgang; and Nickel, Andreas, 4,874,473, Cl. 203-1.000.

Bransden, Antony S.; Megaw, John H. P. C.; Terry, Malcolm J.; and Ward, Brooke A., to Wiggins Teape Group Limited, The. Laser apparatus for repetitively marking a moving sheet. 4,874,919, Cl. 219-121.680.

Bratz, V. David, to SAES Getters S.p.A. Pumping tubulation getter. 4,874,339, Cl. 445-28.000.

Braun Aktiengesellschaft: *See*—
Bergk, Gunther, 4,875,001, Cl. 323-223.000.

Braun, Eugene R.: *See*—
Nellums, Richard A.; and Braun, Eugene R., 4,874,070, Cl. 192-0.052.

Brazdil, James F., Jr.; Glaeser, Linda C.; and Toft, Mark A., to Standard Oil Company, The. Catalyst for ammoxidation of paraffins. 4,874,738, Cl. 502-209.000.

Bredthauer, Richard A., to Ford Aerospace Corporation. Schottky barrier photodiode structure. 4,875,082, Cl. 357-15.000.

Bremner, Robert J.: *See*—
Dunn, Charlton; Bremner, Robert J.; and Meng, Sen Y., 4,874,575, Cl. 376-404.000.

Bretz, Philip E.: *See*—
Sawtell, Ralph R.; Bretz, Philip E.; and Jensen, Craig L., 4,874,440, Cl. 148-437.000.

Bridges, Mark E.; Easterly, Robert W.; and Fredlund, John R., to Eastman Kodak Company. Apparatus and method for aligning a repositionable imaging sensor with a photographic image in a film video system. 4,875,103, Cl. 358-214.000.

Bridgestone Corporation: *See*—
Ezaki, Hiroshi; Kobayashi, Yoneji; and Iida, Katsumi, 4,874,171, Cl. 273-77.00A.

Briggs, Stuart: *See*—
Johns, Ken W. E.; Briggs, Stuart; and Flabbi, Luciano, 4,874,124, Cl. 228-180.100.

Brimhall, Owen D.; Peterson, Stephen C.; Kotlyar, Oleg; and Ghosh Roy, Dilip N., to Utah Bioreseach, Inc. Dual axis continuous flow centrifugation apparatus and method. 4,874,358, Cl. 494-37.000.

Brintec Corporation: *See*—
DeSanti, Raymond J., 4,874,904, Cl. 174-53.000.

Bristol-Meyers Company: *See*—
Vyas, Dolatrai M.; Saulnier, Mark G.; and Kadow, John F., 4,874,851, Cl. 536-17.200.

Bristol-Myers Company: *See*—
Iimura, Seiji; Abe, Yoshio; Okumura, Jun; Naito, Takayuki; and Kamachi, Hajime, 4,874,856, Cl. 540-222.000.
Senter, Peter D., 4,874,779, Cl. 514-410.000.

Britisch Petroleum Company p.l.c., The: *See*—
Callaghan, Ian C.; and Livsey, Ian, 4,874,535, Cl. 252-8.552.

British Aerospace plc: *See*—
Simpson, Hugo R., 4,875,224, Cl. 375-118.000.

British Telecommunications, plc: *See*—
Smith, Carolyn M., 4,875,187, Cl. 364-900.000.

Brock, George W.: *See*—
Favrou, John M.; Lacey, Christopher A.; and Brock, George W., 4,875,129, Cl. 360-122.000.

Brockmann, Werner, to Nixdorf Computer AG. Component produced using integrated technology for the fabrication of integrated circuits. 4,874,968, Cl. 307-303.000.

Brockway, Inc. (N.Y.): *See*—
McMeekin, James H.; Lerch, Alan E.; Chollock, Ronald S.; and Wesdock, James F., 4,874,940, Cl. 250-223.00B.

Brokenshire, Daniel A. Stereoscopic graphics display system with multiple windows for displaying multiple images. 4,875,034, Cl. 340-721.000.

Brooklyn Union Gas Company, The: *See*—
Dessanti, Daniel J.; and Schorr, Hans P., 4,873,839, Cl. 62-238.600.

Brooktree Corporation: *See*—
Lewyn, Lanny L., 4,875,046, Cl. 341-148.000.

Brosselard, Jean-Pierre: *See*—
Pierre, Andre; Batllteu, Francois; Brosselard, Jean-Pierre; Permuy, Alfred; Pirot, Francois-Xavier; and Spirkovitch, Serge, 4,873,868, Cl. 73-517.00R.

Brother Kogyo Kabushiki Kaisha: *See*—
Kobayakawa, Kouji, 4,875,061, Cl. 346-157.000.
Miyabayashi, Takeshi, 4,874,637, Cl. 427-131.000.
Sakaida, Atsuo; Chikaoka, Yasuji; Imoto, Yasuo; Iriguchi, Akira; and Ikezaki, Yoshiyuki, 4,874,978, Cl. 310-328.000.
Sangyoji, Kazuo; Sakai, Jun; Hayashi, Shigeyuki; Suzuki, Makoto; and Kimura, Yasuo, 4,875,074, Cl. 355-27.000.
Shibano, Yasuji, 4,874,323, Cl. 439-260.000.
Ueda, Masashi; Horaguchi, Yoichi; and Sakakibara, Kenji, 4,875,073, Cl. 355-27.000.
Yamane, Hisaaki; and Hirose, Noboru, 4,873,756, Cl. 29-568.000.
Yokoi, Takeshi; and Nakamura, Shigeo, 4,874,262, Cl. 400-216.100.

Brothers, Dennis J.: *See*—
Arefinejad, Majid; Brothers, Dennis J.; and Kosinski, Frederick, 4,874,205, Cl. 297-379.000.

Brothers, Virginia M.: *See*—
Andrews, William H.; Brothers, Virginia M.; Files, James G.; Kuhn, Irene; McCaman, Michael T.; Paul, Leland S.; Sias, Stacey R.; Gore, Thomas C.; Newman, Karel Z., Jr.; and Tedesco, John L., 4,874,705, Cl. 435-252.330.

Brown, Douglas W., to Coal Industry (Patents) Limited. Filter press cloth hanger. 4,874,512, Cl. 210-225.000.

Brown, John A.: *See*—
Vahrenwald, Michael C.; and Brown, John A., 4,873,740, Cl. 15-250.00B.

Brown, John F., III, to Digital Equipment Corporation. Method for implementing synchronous pipeline exception recovery. 4,875,160, Cl. 364-200.000.

Brown, Stephen H.: *See*—
Crabtree, Robert H.; and Brown, Stephen H., 4,874,488, Cl. 204-157.150.

Browne, James M.; and Steiner, Paul A. Impact enhanced prepregs and formulations. 4,874,661, Cl. 428-246.000.

Bruhl, J. D.; and Geisinger, William R. Volumetric leak detection means and method. 4,873,863, Cl. 73-49.200.

Brun, Pierre, to Compagnie Europenne Du Zirconium Cezus. Process and devices for operation of an apparatus which functions by using a flow of a liquid film. 4,874,559, Cl. 261-67.000.

Brunel, Christian: *See*—
Menn, Roger; Brunel, Christian; and Pecile, Dario, 4,874,986, Cl. 313-505.000.

Brunetti, Brunetto; and Prada, Marco, to Ellem Industria Farmaceutica S.p.A. Tripeptide with immunostimulating activity. 4,874,844, Cl. 530-331.000.

Brungardt, Catherine R.: *See*—
Sircar, Jagadish C.; Brungardt, Catherine R.; and Schwender, Charles F., 4,874,862, Cl. 544-276.000.

Bruns, Robert F.: *See*—
Carethers, Mary E.; Centenko, Wiaczeslaw A.; Connor, David T.; Johnson, Elizabeth A.; Kiely, John S.; Schwender, Charles F.; Sircar, Jagadish C.; Sorenson, Roderick J.; Unangst, Paul C.; and Bruns, Robert F., 4,874,758, Cl. 514-226.500.

Brunswick Corporation: *See*—
Garthwaite, Steven C., 4,873,951, Cl. 123-196.00W.
Sheridan, Stephen E., 4,874,959, Cl. 290-1.00B.

Brustle, Klaus: *See*—
Rock, Erich; and Brustle, Klaus, 4,874,212, Cl. 312-330.100.

BTS Broadcast Television Systems GmbH: *See*—
Eisenberg, Gerd, 4,874,994, Cl. 318-257.000.
Poetsch, Dieter, 4,875,102, Cl. 358-214.000.

Bubeck, Robert A.; Clipper, Robert B.; and Henton, David E., to Dow Chemical Company, The. ABS Compositions having trimodal rubber particle distributions. 4,874,815, Cl. 525-71.000.

Bubik, Leslie, to Vulcan Equipment Company. Low profile vehicle lifting and towing device. 4,874,285, Cl. 414-563.000.

Bubolz, Petra: *See*—
Borchers, Jurgen; and Bubolz, Petra, 4,874,811, Cl. 524-516.000.

Bucci, George H., to Whitehead Engineered Products, Inc. System for controlling the release of fuel vapors from a vehicle fuel tank. 4,874,020, Cl. 141-59.000.

Buchmann, Winfried: *See*—
Jung, Rolf; Buss, Albert; and Buchmann, Winfried, 4,874,157, Cl. 270-30.000.

Buddy L. Corporation: *See*—
Auer, Robert T., 4,875,147, Cl. 362-205.000.

Buehler, Ltd.: *See*—
Linke, Thomas A.; Dandan, Issa R.; Livingston, Troy W.; and Wilkerson, Alan W., 4,873,792, Cl. 51-165.800.

Bullock, Donald. Oxidation saturation device. 4,874,509, Cl. 210-169.000.

Bulso, Joseph D., Jr.; and McClung, James A., to Redicon Corporation. Apparatus for controlling movement in a single action forming press. 4,873,859, Cl. 72-336.000.

Buoli, Carlo, to Siemens Telecomunicazioni S.p.A. Microstrip transmission line for coupling to a dielectric resonator. 4,875,025, Cl. 333-230.000.

Burch, Elsward K., to Nu-Tech Systems, Inc. Tire debeading machine. 4,873,759, Cl. 29-700.000.

Burgi, Ernst: *See*—
Oxenius, Rudiger; Burgi, Ernst; Arnold, Vladimir; and Rakoczi, Ferenc, 4,874,847, Cl. 534-565.000.

Burke, Gary R., to Silicon Connections Corporation. Non-contact I/O signal pad scan testing of VLSI circuits. 4,875,003, Cl. 324-73.00R.

Burke, Michael W.: *See*—
Pompei, Francesco; and Burke, Michael W., 4,874,253, Cl. 374-121.000.

Burke, Patrick E., to Guthrie Canadian Investments Limited. Induction heating and melting systems having improved induction coils. 4,874,916, Cl. 219-10.750.

Burkhalter, William E.: *See*—
Finnieston, Alan; Burkhalter, William E.; Reyes, Franklin; and Latta, Loren L., 4,873,968, Cl. 128-87.00R.

Burleigh Instruments, Inc.: *See*—
Rapp, Louis N., 4,874,979, Cl. 310-328.000.

Burlington Industries, Inc.: *See*—
Archer, Timothy H. V.; Bowman, Randy; and Glenn, Michael I., 4,875,054, Cl. 346-1.100.

Burnett, George H.: *See*—
Tamol, Ronald A.; Nepomuceno, Jose G.; Keritsis, Gus D.; Burnett, George H.; Thesing, Richard A.; Winterson, Warren D.; and Nichols, Walter A., 4,874,000, Cl. 131-375.000.

Burnham, Robert D.: *See*—
Thornton, Robert L.; and Burnham, Robert D., 4,875,216, Cl. 372-45.000.

Burroughs, James A.: *See*—
Benson, David J.; and Burroughs, James A., 4,874,992, Cl. 315-387.000.

Burroughs Wellcome Co.: *See*—
Beacham, Lowrie M., III; LeBlanc, Harry S.; and Freeman, George A., 4,874,751, Cl. 514-50.000.
Rideout, Janet L.; Barry, David W.; Lehrman, Sandra N.; St. Clair, Martha H.; and Furman, Phillip A., 4,874,609, Cl. 424-85.400.

Busch, Peter: *See*—
Lange, Fritz; Busch, Peter; and Thiele, Klaus, 4,874,554, Cl. 260-404.000.

Busker, L. H.: *See*—
Pulkowski, Jeffrey H.; Macklem, Elizabeth A.; and Busker, L. H., 4,874,469, Cl. 162-359.000.

Buss, Albert: *See*—
Jung, Rolf; Buss, Albert; and Buchmann, Winfried, 4,874,157, Cl. 270-30.000.

Butler Manufacturing Company: *See*—
Heisey, Raymond K., Jr.; Barker, W. David; Mariano, Arturo C.; and Thurnau, Vernon L., 4,873,808, Cl. 52-478.000.

Butterfield, Roger P.; Neumann, Guenter J.; and Wykstra, Curt A., to Borg-Warner Automotive, Inc. Variable speed transmission. 4,873,879, Cl. 74-689.000.

B.V. Asphalt-en Chemische Fabrieken Smid and Hollander: *See*—
Hollander, Jan, 4,874,652, Cl. 428-137.000.

Byrd, Paul S.: *See*—
George, Eric R.; Danforth, Richard L.; and Byrd, Paul S., 4,874,801, Cl. 523-214.000.

Byrd, William A.: *See*—
Bansal, Madan L.; and Byrd, William A., 4,874,972, Cl. 310-57.000.

C & D Engineering Company: *See*—
King, David E., 4,873,856, Cl. 72-121.000.

C. G. Bretting Manufacturing Co., Inc.: *See*—
Retzloff, Timm G., 4,874,158, Cl. 270-39.000.

Cadien, Ken C.: *See*—
Vacha, Lubos J. B.; Schultz, Peter C.; Moynihan, Cornelius T.; Raychaudhuri, Satyabrata; Cadien, Ken C.; Harbison, Barry B.; and Mossadegh, Reza, 4,874,222, Cl. 350-96.340.

Calabresi, Paul; Wiemann, Michael C.; and Chu, Ming Y. W. Reduction of the severity 3'-azido-3'-deoxythymidine-induced anemia using benzylacyclouridine. 4,874,602, Cl. 424-10.000.

Calgon Corporation: *See*—
Gill, Jasbir S., 4,874,527, Cl. 210-700.000.

California Institute of Technology: *See*—
Katz, Joseph, 4,874,953, Cl. 250-493.100.

Callaghan, Ian C.; and Livsey, Ian, to Britisch Petroleum Company p.l.c., The. Scale inhibitors. 4,874,535, Cl. 252-8.552.

Callerame, Joseph. Process for the production of chlorine dioxide. 4,874,489, Cl. 204-157.440.

CALPAC Incorporated: *See*—
Bates, Howard M., 4,874,125, Cl. 229-132.000.

Camaggi, Giovanni: *See*—
Menconi, Augusto; Camaggi, Giovanni; Gozzo, Franco; Mirenna, Luigi; and Garavaglia, Carlo, 4,874,786, Cl. 514-528.000.

Cambruzzi, Louis: *See*—
Olodort, Robert; Micalizzi, Charles; Cambruzzi, Louis; and Turchik, Randy, 4,875,174, Cl. 364-519.000.

Cameron Iron Works U.S.A., Inc.: *See*—
Lawson, John E., 4,874,008, Cl. 137-315.000.

Campana, Thomas J., Jr.: *See*—
Andros, Andrew A.; Campana, Thomas J., Jr.; Thelen, Gary F.; and Kinast, Robert A., 4,875,039, Cl. 340-825.440.

Campardo, Giovanni; and Novosel, David, to SGS Microelettronica S.p.A. Circuital device for the power-on reset of digital integrated circuits in MOS technology. 4,874,965, Cl. 307-272.300.

Campbell, John W.: *See*—
McGahee, Welbourne D.; and Campbell, John W., 4,873,783, Cl. 43-42.240.

Campbell Soup Company: *See*—
Wu, Lung-chi, 4,874,419, Cl. 71-5.000.

Campbell, Thomas P. Centrifugal flotation apparatus. 4,874,357, Cl. 494-26.000.

Canadian Patent and Development Ltd.: *See*—
Mikhlin, Josef A.; Capes, C. Edward; Divanji, Haresh S.; and Coleman, Richard D., 4,874,393, Cl. 44-20.000.

Canadian Patents and Development Limited: *See*—
Cielo, Paolo; Krapez, Jean-Claude; Cole, Kenneth C.; and Vaudreuil, Ghislain, 4,874,948, Cl. 250-341.000.

Cang, John N.; Gast, Joseph R.; Hensley, John J.; and Waldhelm, Christian M., to Solar Turbines Incorporated. Turbine blade top clearance control system. 4,874,290, Cl. 415-173.400.

Canon Denshi Kabushiki Kaisha: *See*—
Yamomoto, Hiroshi; Yoshida, Shigeru; and Yoshida, Katumi, 4,874,233, Cl. 350-429.000.

Canon Kabushiki Kaisha: *See*—
Kashida, Motokazu; and Masui, Toshiyuki, 4,875,222, Cl. 375-26.000.
Masuda, Kazuaki, 4,875,059, Cl. 346-140.00R.
Ohashi, Kazuhito, 4,875,105, Cl. 358-310.000.
Ono, Takeshi, 4,875,056, Cl. 346-76.0PH.
Shimokoriyama, Makoto; Yamashita, Shinichi; Abe, Naoto; Kashida, Motokazu; Takei, Masahiro; and Takahashi, Koji, 4,875,090, Cl. 358-12.000.
Sootome, Sumitoshi; Mizutani, Morikazu; Ikemoto, Isao; Kanemitsu, Shinji; Kitajima, Hajime; and Onoda, Shigeyoshi, 4,875,075, Cl. 355-50.000.

Suda, Shigeyuki, 4,874,230, Cl. 350-423.000.
Takada, Yusaku; and Takeda, Kenji, 4,875,069, Cl. 355-271.000.
Takahashi, Kazuo; and Kubo, Hiroyoshi, 4,874,954, Cl. 250-548.000.
Tamura, Shuichi, 4,874,239, Cl. 356-4.000.
Torigoe, Makoto; and Suzuki, Akiyoshi, 4,875,076, Cl. 355-53.000.
Yamomoto, Hiroshi; Yoshida, Shigeru; and Yoshida, Katumi, 4,874,233, Cl. 350-429.000.

Canonge, Sidney J., to William H. Takahashi. Clothes dryer for use with forced air heating system. 4,873,773, Cl. 34-90.000.

Canzano, Pasquale S.; and Vinton, Brock J. Gas pressure regulator for controlling low pressure. 4,874,011, Cl. 137-505.130.

Capes, C. Edward: *See*—
Mikhlin, Josef A.; Capes, C. Edward; Divanji, Haresh S.; and Coleman, Richard D., 4,874,393, Cl. 44-20.000.

Capocelli, Piero: *See*—
Daniele, Vincenzo; Monti, Marco M.; Taliercio, Michele; and Capocelli, Piero, 4,875,020, Cl. 330-307.000.

Car-O-Liner Company: *See*—
Bergstrom, Hans R., 4,873,861, Cl. 72-457.000.

Carsocciolo, Louis D. Ozonization of containers. 4,874,435, Cl. 134-22.180.

Carduck, Franz-Josef: *See*—
Richtler, Hans-Joachim; Kreutzer, Udo; Carduck, Franz-Josef; Koester, Klaus; and Harth, Hubert, 4,874,552, Cl. 260-400.000.

Carethers, Mary E.; Centenko, Wiaczeslaw A.; Connor, David T.; Johnson, Elizabeth A.; Kiely, John S.; Schwender, Charles F.; Sircar, Jagadish C.; Sorenson, Roderick J.; Unangst, Paul C.; and Bruns, Robert F., to Warner-Lambert Company. Novel enolamides, pharmaceutical compositions and methods of use thereof for activity as modulators of the arachidonic acid cascade. 4,874,758, Cl. 514-226.500.

Carl Freudenberg, Firma: *See*—
Andra, Rainer; Kurr, Klaus; Ullrich, Gunter; and Dorge, Udo, 4,873,887, Cl. 74-573.00F.

Carlson, Dennis L.: *See*—
Fingerson, Conrad F.; Carlson, Dennis L.; Nelson, Bruce A.; and Eickhoff, Robert D., 4,874,180, Cl. 273-416.000.

Carr, F. Patrick; Dillard, Robert D.; and McCullough, Doris E., to Eli Lilly and Company. Leukotriene antagonists. 4,874,777, Cl. 514-381.000.

Carrier Corporation: *See*—
Voorhis, Roger J.; and Palmer, John M., 4,873,838, Cl. 62-207.000.

Carroll, Francis A., to Institute for Industrial Research and Standards. Product display and dispensing unit. 4,874,210, Cl. 312-257.100.

Carroll, Paul E.; James, Roy W., III; Bowen, Charles K.; and Smith, Gillan C., to Input/Output, Inc. Bandwidth enhancing seismic acquisition system and method. 4,875,166, Cl. 364-421.000.

Carter, Duane E.: *See*—
Jucha, Rhett B.; Carter, Duane E.; Davis, Cecil J.; and Crank, Sue E., 4,874,723, Cl. 437-245.000.

Cartier, George E.; and Farmer, Peter H., to Monsanto Company. Cross-linked polyvinyl butyral. 4,874,814, Cl. 525-61.000.

Cary, Richard W.; and Guyon, Richard D., to Amdahl Corporation. Version management system using plural control fields for synchronizing two versions of files in a multiprocessor system. 4,875,159, Cl. 364-200.000.

Casanave, Anthony J. Cabinetry instrument. 4,873,769, Cl. 33-194.000.

Casey Jr., Walter P., to Wetco of Delaware, Inc. Tubular element for reverse osmosis water pruification. 4,874,514, Cl. 210-321.870.

Casio Computer Co., Ltd.: *See*—
Umeda, Osamu; Nakakusu, Tohru; Sato, Makoto; and Shimazaki, Tatsuo, 4,875,064, Cl. 353-78.000.
Yoshida, Tetsushi, 4,874,543, Cl. 252-299.610.

Casler, Richard J., Jr.: *See*—
Daggett, Kenneth E.; Onaga, Eimei M.; Casler, Richard J., Jr.; and Johnson, Richard A., 4,874,997, Cl. 318-568.100.

Casse, Pierre; and Chasseguet, Gustave, to Valeo. Torsional damper device comprising two coaxial parts cooperating with circumferentially acting springs. 4,874,350, Cl. 464-68.000.

Castenmiller, Wilhelmus A. M.; Chesters, Allan K.; and Ernsting, Peter B., to Lever Brothers Company. Edible plastic product. 4,874,626, Cl. 426-564.000.

Caterpillar Inc.: *See*—
Avery, Bennett W.; and Engel, William K., 4,873,894, Cl. 74-785.000.
Purcell, Robert J.; and Farris, Robert R., 4,874,052, Cl. 180-9.100.

CCM S.r.l.: *See*—
Crispoldi, Antonio; Moriconi, Andrea; and Chiappafreddo, Mario, 4,874,595, Cl. 423-397.000.

Ceccarelli, Christopher: *See*—
Garg, Diwaker; Klucher, Beth A.; Dyer, Paul N.; Kidd, Richard W.; and Ceccarelli, Christopher, 4,874,642, Cl. 427-249.000.

Cello Bag Company, Inc.: *See*—
Ball, James R.; and Barnard, Delbert J., 4,874,255, Cl. 383-8.000.

Centenko, Wiaczeslaw A.: *See*—
Carethers, Mary E.; Centenko, Wiaczeslaw A.; Connor, David T.; Johnson, Elizabeth A.; Kiely, John S.; Schwender, Charles F.; Sircar, Jagadish C.; Sorenson, Roderick J.; Unangst, Paul C.; and Bruns, Robert F., 4,874,758, Cl. 514-226.500.

Central Glass Company, Limited: *See*—
Makita, Kensuke; Hattori, Akimasa; and Tanaka, Katsuto, 4,874,462, Cl. 156-635.000.

Centre de Recherches Metallurgiques–Centrum Voor Research in de Metallurgie: *See*—
Wilmotte, Stephan, 4,874,471, Cl. 164-437.000.

Centre International de Recherches Dermatologiques (CIRD): *See*—
Shroot, Braham; Eustache, Jacques; Bernardon, Jean-Michel; and Nedoncelle, Philippe, 4,874,747, Cl. 514-23.000.

Cermak, Jan: *See*—
Vitovec, Jaroslav; Cermak, Jan; and Smolik, Jiri , 4,874,409, Cl. 55-267.000.

Cerni, Todd A.: *See*—
Nelson, Loren D.; and Cerni, Todd A., 4,874,572, Cl. 376-256.000.

Ceska, Gary W, to Sartomer Company, Inc. Method of protecting or reconditioning a surface with a polymer concrete. 4,874,675, Cl. 428-521.000.

Ceske vysoke uceni Technicke, rektorat: *See*—
Kabatek, Jan; and Ditl, Pavel, 4,874,249, Cl. 366-339.000.

Ceskoslovenska akademie ved: *See*—
Vitovec, Jaroslav; Cermak, Jan; and Smolik, Jiri , 4,874,409, Cl. 55-267.000.
Wichterle, Otto, 4,874,234, Cl. 351-161.000.

CFC Fabrication Corporation: *See*—
Shook, Hal C.; and Holland, Carmon D., 4,873,738, Cl. 14-1.000.

Chak, Alexander: *See*—
Chak, Maryan; and Chak, Alexander, 4,874,496, Cl. 204-229.000.

Chak, Maryan; and Chak, Alexander. Device for silverizing drinking water. 4,874,496, Cl. 204-229.000.

Chakraborty, Asok; Urlaub, Herbert; Grof, Franz; and Cosack, Klaus, to Schleicher & Schuell GmbH. Disposable filter unit with filter support means at both sides of the filter element. 4,874,513, Cl. 210-321.840.

Chakraborty, Utpal: *See*—
Youssefyeh, Raymond; Chakraborty, Utpal; Magnien, Ernest; Desai, Rohit; and Lee, Thomas D-Y, 4,874,769, Cl. 514-314.000.

Chancellor, Craig A.: *See*—
Mathewes, James K., Jr.; Chancellor, Craig A.; and Howes, H. Frank, 4,875,209, Cl. 371-3.000.

Chandler, Donald G.; Batterman, Eric P.; and Shah, Govind, to United Parcel Service of America, Inc. Hexagonal, information encoding article, process and system. 4,874,936, Cl. 235-494.000.

Chandler, Howard, to Quadra Logic Technologies Inc. Membrane-supported immunoassays. 4,874,691, Cl. 435-7.000.

Chandley, George D., to General Motors Corporation. Countergravity casting process and apparatus using destructible patterns suspended in an inherently unstable mass of particulate mold material. 4,874,029, Cl. 164-34.000.

Chang, Peng-Heng: *See*—
Malhi, Satwinder D. S.; Shen, Chi-Cheong; Bean, Kenneth E.; and Chang, Peng-Heng, 4,875,086, Cl. 357-54.000.

Chang, Stephen S.; Bao, Yongde; and Pelura, Timothy J. Purification of fish oil. 4,874,629, Cl. 426-601.000.

Charboneau, Thomas: *See*—
Bishop, Robert P.; Sabetti, Anthony J.; and Charboneau, Thomas, 4,875,135, Cl. 361-283.000.

Chasseguet, Gustave: *See*—
Casse, Pierre; and Chasseguet, Gustave, 4,874,350, Cl. 464-68.000.

Chau, C. C.; and Im, Jang-hi, to Dow Chemical Company, The. Process of making a porous membrane. 4,874,568, Cl. 264-49.000.

Chen, Loren: *See*—
Peterson, David; Chen, Loren; and Iliff, Robert J., 4,874,537, Cl. 252-99.000.

Chene, Alain, to Rhone-Poulenc Agrochimie S.A. Process for the preparation of aryloxybenzoic acids containing a sulfonamide group. 4,874,846, Cl. 534-560.000.

Chern, Shyh. Ratchetless reversible wrench. 4,873,898, Cl. 81-59.100.

Chesters, Allan K.: *See*—
Castenmiller, Wilhelmus A. M.; Chesters, Allan K.; and Ernsting, Peter B., 4,874,626, Cl. 426-564.000.

Chevallier, Yvonick, to Rhone-Poulenc Specialites Chimiques. Silica with a high oil absorption capability and a controlled primary structure and process for the production thereof. 4,874,594, Cl. 423-335.000.

Cheysson, Francoise; and Migozzi, Jean-Blaise, to Thomson-CSF. Clear holographic helmet visor and process of producing same. 4,874,214, Cl. 350-3.700.

Chiappafreddo, Mario: *See*—
Crispoldi, Antonio; Moriconi, Andrea; and Chiappafreddo, Mario, 4,874,595, Cl. 423-397.000.

Chiavetta, Sebastiano R.; and De Guglielmi, Giorgio, to Applause, Inc.; and Jockline, S R L. Rocking toy. 4,874,163, Cl. 272-53.200.

Chiba, Shigeru. Ultrasonic cell-destroyer. 4,874,137, Cl. 241-301.000.

Chikamasa, Hiroshi: *See*—
Komatsu, Kazunori; Chikamasa, Hiroshi; and Sato, Tsunehiko, 4,874,633, Cl. 427-48.000.

Chikaoka, Yasuji: *See*—
Sakaida, Atsuo; Chikaoka, Yasuji; Imoto, Yasuo; Iriguchi, Akira; and Ikezaki, Yoshiyuki, 4,874,978, Cl. 310-328.000.

Chikuma, Isamu; Shimada, Satoru; and Eda, Hiroshi, to Nippon Seiko Kabushiki Kaisha. Four-wheel steering apparatus of a vehicle. 4,874,183, Cl. 280-91.000.

Chisso Corporation: *See*—
Miya, Shinya; Harada, Masato; Mise, Takaya; and Yamazaki, Hiroshi, 4,874,880, Cl. 556-53.000.
Yoshida, Naoyuki; Kitano, Kisei; and Ogawa, Tetsuya, 4,874,546, Cl. 252-299.610.

Chiu, Shui W. Sleep-preventing alarm device. 4,875,030, Cl. 340-575.000.

Chiyoda Corporation: *See*—
Wakabayashi, Ataru; Umehara, Yohichi; Morie, Satsuki; Kuwahara, Ikuro; and Okada, Yoshimi, 4,874,483, Cl. 204-94.000.

Choi, Hee-June: *See—*
Henley, Francois G.; Choi, Hee-June; Kratzer, Dean J.; and Barr, Maurice R., 4,875,006, Cl. 324-158.00R.
Chollock, Ronald S.: *See—*
McMeekin, James H.; Lerch, Alan E.; Chollock, Ronald S.; and Wesdock, James F., 4,874,940, Cl. 250-223.00B.
Chou, An-Chuan. Warning triangle. 4,875,028, Cl. 340-473.000.
Christensen, Ronald J.: *See—*
Steimel, Lyle H.; and Christensen, Ronald J., 4,874,541, Cl. 252-178.000.
Christiansen, Margot H.: *See—*
Lauritzen, Ann M.; Baker, David S.; Christiansen, Margot H.; Johnson, Beamon M.; and Schuren, John G., 4,874,879, Cl. 549-536.000.
Christiansen, Torben F.; and Kokholm, Finn, to Radiometer A/S. Membrane for an electrochemical measuring electrode device. 4,874,501, Cl. 204-415.000.
Christner, Angelika: *See—*
Hofmann, Ingrid; Mutschler, Ernst; and Christner, Angelika, 4,874,763, Cl. 514-249.000.
Chromatic Paint Corporation: *See—*
Valasek, Raymond J., 4,874,108, Cl. 220-93.000.
Chrysler Motors Corporation: *See—*
Klein, Frank H.; Selby, Steven F.; and Klueger, Sigmund, 4,874,110, Cl. 220-241.000.
Moulds, Julie M., 4,874,098, Cl. 211-13.000.
Murray, Theodore L., 4,873,837, Cl. 62-199.000.
Chu, Ming Y. W.: *See—*
Calabresi, Paul; Wiemann, Michael C.; and Chu, Ming Y. W., 4,874,602, Cl. 424-10.000.
Chuang, Cliff, to Prospects Corp. Automatic motor vehicle visor system. 4,874,938, Cl. 250-203.00R.
Chung, Tai-Shung: *See—*
McMahon, Paul; Chung, Tai-Shung; and Ying, Lincoln, 4,874,563, Cl. 264-29.200.
Cianci, Flavio: *See—*
Rescalli, Carlo; Ricci, Riziero; Scazzosi, Adriano; and Cianci, Flavio, 4,874,474, Cl. 203-18.000.
Ciba-Geigy Corporation: *See—*
Back, Gerhard; and Beffa, Fabio, 4,874,848, Cl. 534-684.000.
Back, Gerhard; Beffa, Fabio; Schlesinger, Ulrich; and Puntener, Alois, 4,874,849, Cl. 534-696.000.
Farooq, Saleem, 4,874,778, Cl. 514-403.000.
Grade, Reinhardt; and Thomas, Brien M., 4,874,526, Cl. 210-697.000.
Mulhaupt, Rolf; and Simon, Hubert, 4,874,805, Cl. 524-188.000.
Oxenius, Rudiger; Burgi, Ernst; Arnold, Vladimir; and Rakoczi, Ferenc, 4,874,847, Cl. 534-565.000.
Reinert, Gerhard, 4,874,391, Cl. 8-442.000.
Stegmann, Werner; Meier, Hans R.; Evans, Samuel; Martin, Roger; and Luisoli, Reto, 4,874,885, Cl. 560-15.000.
Cielo, Paolo; Krapez, Jean-Claude; Cole, Kenneth C.; and Vaudreuil, Ghislain, to Canadian Patents and Development Limited. Method and apparatus for evaluating the degree of cure in polymeric composites. 4,874,948, Cl. 250-341.000.
Cinadr, Bernard F., to B. F. Goodrich Company, The. Chlorinated polyvinyl chloride-vinyl acetate copolymers having good low and high temperature stability. 4,874,823, Cl. 525-329.200.
Ciniglio, Alexander J. Soldering apparatus. 4,873,938, Cl. 118-302.000.
Cintas Corporation: *See—*
Milton, David W., 4,873,878, Cl. 73-865.800.
Circon Corporation: *See—*
Morris, David L.; Filip, Mihail; D'Amelio, Frank D.; Esposito, Dominick G.; and Quint, Robert H., 4,874,364, Cl. 604-35.000.
City of Hope: *See—*
Rossi, John J., 4,874,853, Cl. 536-27.000.
Ciumaga, Massimo. Screw driving device. 4,873,900, Cl. 81-436.000.
Cla-Val Co.: *See—*
Ensign, Harold W., 4,874,531, Cl. 210-744.000.
Clamens, Serge: *See—*
Teissier, Remy; and Clamens, Serge, 4,874,859, Cl. 544-221.000.
Clarion Co., Ltd.: *See—*
Mori, Masaharu, 4,875,221, Cl. 375-1.000.
Clark, Gary E., to Parker, Wade; and Heywood, Richard G. Stroller apparatus for juvenile car seat. 4,874,182, Cl. 280-30.000.
Clark, Michael: *See—*
Ashkin, Peter B.; and Clark, Michael, 4,875,158, Cl. 364-200.000.
Clarke, Leslie T., to Pilkington PLC. Shielding panel. 4,874,903, Cl. 174-35.0MS.
Clarkson, Carroll E.: *See—*
Collins, Arthur R.; and Clarkson, Carroll E., 4,874,297, Cl. 417-265.000.
Clauser, John F. Rotation, acceleration, and gravity sensors using quantum-mechanical matter-wave interferometry with neutral atoms and molecules. 4,874,942, Cl. 250-251.000.
Clayton, Charles H. Straight hole drilling method and assembly. 4,874,045, Cl. 175-57.000.
Clements, Thomas W.: *See—*
Fallon, Merton R.; and Clements, Thomas W., 4,874,116, Cl. 222-399.000.
Cleveland, Gary D. Miter saw utility stand. 4,874,025, Cl. 144-287.000.
Clifford & Snell Limited: *See—*
Bennett, Brian S.; and Smith, David, 4,873,933, Cl. 441-36.000.
Clipper, Robert B.: *See—*
Bubeck, Robert A.; Clipper, Robert B.; and Henton, David E., 4,874,815, Cl. 525-71.000.
Clorox Company, The: *See—*
Peterson, David; Chen, Loren; and Iliff, Robert J., 4,874,537, Cl. 252-99.000.
Coal Industry (Patents) Limited: *See—*
Brown, Douglas W., 4,874,512, Cl. 210-225.000.
Coccodrilli, Gus D., Jr.: *See—*
Boyle, Peter C.; Steffen, Daniel G.; Melton, John L.; Coccodrilli, Gus D., Jr.; and Nagy, Michael A., 4,874,606, Cl. 426-74.000.
Cochrane, Faith E.; Smith, Michael J.; and Litvay, John D., to Kimberly-Clark Corporation. Tissue products containing sliced fibers. 4,874,465, Cl. 162-111.000.
Codling, Daryl O., to Colt Industries Inc. Fail-safe idle bypass system. 4,873,954, Cl. 123-339.000.
Cohen, Leslie A.: *See—*
Hallden-Abberton, Michael P.; Cohen, Leslie A.; and Wood, Robert S., 4,874,824, Cl. 525-379.000.
Colanzi, Franco; and Vignotto, Angelo, to Riv-SKF Officine di Villar Perosa S.p.A. Seal for bearings. 4,874,261, Cl. 384-484.000.
Coldren, Larry A.; and Skidmore, Jay A., to University of California, The Regents of the. Low damage-producing, anisotropic, chemically enhanced etching method and apparatus. 4,874,459, Cl. 156-643.000.
Cole, Jack H., to Conoco Inc. Downhole orbital seismic source. 4,874,061, Cl. 181-106.000.
Cole, Kenneth C.: *See—*
Cielo, Paolo; Krapez, Jean-Claude; Cole, Kenneth C.; and Vaudreuil, Ghislain, 4,874,948, Cl. 250-341.000.
Colegrove, George T.; and Lindroth, Thomas A., to Merck & Co., Inc. Solid, herbicidal complexes. 4,874,423, Cl. 71-95.000.
Colegrove, George T.; and Lindroth, Thomas A., to Merck & Co., Inc. Low viscosity heteropolysaccharides. 4,874,854, Cl. 536-114.000.
Coleman, Jerry E.: *See—*
Antoni, Patricia A.; Nolan, Timothy J.; Hayes, Thomas J.; Arneson, Theodore R.; and Coleman, Jerry E., 4,874,083, Cl. 206-45.320.
Coleman, Richard D.: *See—*
Mikhlin, Josef A.; Capes, C. Edward; Divanji, Haresh S.; and Coleman, Richard D., 4,874,393, Cl. 44-20.000.
Collier, William R. Climate control apparatus. 4,874,127, Cl. 236-49.500.
Collins, Arthur R.; and Clarkson, Carroll E. Radial pump. 4,874,297, Cl. 417-265.000.
Collins, David: *See—*
Trumbull, Douglas; Collins, David; Smith, Wayne; and Spieldiener, Robert, 4,874,162, Cl. 272-18.000.
Collins, Marcus H.; and Diesch, Ronald W., to Eaton Corporation. Clutch and brake rapid exhaust manifold. 4,874,068, Cl. 192-18.00A.
Collins, Scott D.: *See—*
Smith, Rosemary L.; and Collins, Scott D., 4,874,499, Cl. 204-403.000.
Colt Industries Inc.: *See—*
Codling, Daryl O., 4,873,954, Cl. 123-339.000.
McAuliffe, Lawrence, Jr., 4,873,955, Cl. 123-339.000.
Columbia Manufacturing Corporation: *See—*
Riegelman, Harry, 4,873,741, Cl. 16-105.000.
Colvert, James H., to Texaco Inc. Bubble cap assembly in an ebullated bed reactor. 4,874,583, Cl. 422-143.000.
Comben, Richard H.; Gilman, Byron L.; and Shturman, Leonid, to Medilase, Inc. Control handle. 4,874,371, Cl. 604-95.000.
Combustion Engineering, Inc.: *See—*
Crick, David L.; and Hayes, James K., 4,874,041, Cl. 165-162.000.
Kieache, Eric A.; and Crabtree, Samuel B., 4,873,753, Cl. 29-157.30R.
Commodore-Amiga, Inc.: *See—*
Miner, Jay G.; Dean, Dave; Decuir, Joseph C.; Nicholson, Ronald H.; and Tanaka, Akio, 4,874,164, Cl. 273-1.00E.
Comolli, Alfred G.: *See—*
MacArthur, James B.; Comolli, Alfred G.; and McLean, Joseph B., 4,874,506, Cl. 208-413.000.
Compagnie Europenne Du Zirconium Cezus: *See—*
Brun, Pierre, 4,874,559, Cl. 261-67.000.
Comper, Lucia; and Ferrari, Francesco, to Montedipe S.p.A. Cutting device for high-temperature granulation of thermoplastic polymers. 4,874,307, Cl. 425-311.000.
Conlon, Edward J.: *See—*
Prabhu, Ashok N.; Hang, Kenneth W.; and Conlon, Edward J., 4,874,550, Cl. 252-512.000.
Connor, David T.: *See—*
Carethers, Mary E.; Centenko, Wiaczeslaw A.; Connor, David T.; Johnson, Elizabeth A.; Kiely, John S.; Schwender, Charles F.; Sircar, Jagadish C.; Sorenson, Roderick J.; Unangst, Paul C.; and Bruns, Robert F., 4,874,758, Cl. 514-226.500.
Conoco Inc.: *See—*
Cole, Jack H., 4,874,061, Cl. 181-106.000.
Conroy, Francis; Flahavan, John; and Flahavan, Edward, to Food and Cereal Research Limited. Process for manufacturing a reconstitutable cereal. 4,874,624, Cl. 426-457.000.
Cook, John L. Can holder. 4,874,109, Cl. 220-94.00R.
Cook, Leonard C. Method to control the discharge of effluent. 4,875,178, Cl. 364-578.000.
Cooley, William U.: *See—*
Paton, Eric R.; and Cooley, William U., 4,874,120, Cl. 224-266.000.
Cooper, Bryan, to BASF Aktiengesellschaft. Preparation of coniferylaldehyde by a microorganism. 4,874,701, Cl. 435-147.000.
Cooper, Lyndon F.: *See—*
Featherstone, John D. B.; Cooper, Lyndon F.; Myers, Michael L.; and Nelson, Dennis G. A., 4,874,315, Cl. 433-215.000.

Corday, Debbie J.: *See*—
Lynch, Carol J.; and Corday, Debbie J., 4,874,028, Cl. 160-332.000.

Cordis Corporation: *See*—
Hillstead, Richard A., 4,874,378, Cl. 604-167.000.

Cork, William H., to Prism Technology, Inc. System for optically interrogating liquid samples and for withdrawing selected sample portions. 4,873,875, Cl. 73-863.010.

Cornette, Henri: *See*—
Arnau-Munoz, Jose L.; and Cornette, Henri, 4,874,107, Cl. 220-20.000.

Corning Incorporated: *See*—
Beall, George H.; Pierson, Joseph E.; and Quinn, Candace J., 4,874,724, Cl. 501-10.000.

Coronet-Werke Heinrich Schlerf GmbH: *See*—
Weihrauch, Georg, 4,874,115, Cl. 222-386.000.

Cosack, Klaus: *See*—
Chakraborty, Asok; Urlaub, Herbert; Grof, Franz; and Cosack, Klaus, 4,874,513, Cl. 210-321.840.

Costa, Sylvestre M.: *See*—
Elkin, Alfred A.; and Costa, Sylvestre M., 4,874,446, Cl. 156-66.000.

Cousin, Michael J., to Mead Corporation, The. Tall oil neutrals to protect plants from insects and the like. 4,874,610, Cl. 424-196.100.

Couture, William F., to IBP, Inc. Method and apparatus for supporting animal carcasses and pulling hides therefrom. 4,873,749, Cl. 17-50.000.

Covey, Douglas F.; and Auchus, Ricahrd J., to Washington University. Open "D" ring hormone analogs. 4,874,891, Cl. 560-256.000.

Cowan, James J., to Polaroid Corporation. Method of forming volume phase reflection holograms. 4,874,213, Cl. 350-3.670.

Cox, Doyle W. Cooling plant load reduction apparatus and method. 4,873,834, Cl. 62-87.000.

Cox, Terry L. Master cylinder pressure-retaining vehicular anti-theft brake locking mechanism. 4,873,824, Cl. 60-545.000.

Coy, Bruce H.; and Yuen, Raymond C., to Applied Micro Circuits Corporation. ECL output with Darlington or common collector-common emitter drive. 4,874,970, Cl. 307-475.000.

Coym, Jurgen: *See*—
Freidank, Michael; Coym, Jurgen; and Schubert, Axel, 4,873,970, Cl. 128-202.220.

Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., to Exxon Research and Engineering Company. Copolymer compositions containing a narrow MWD component and process of making same. 4,874,820, Cl. 525-240.000.

Crabtree, Robert H.; and Brown, Stephen H., to Yale University. Photochemical dimerization and functionalization of alkanes, ethers, primary and secondary alcohols, phosphine oxides and silanes. 4,874,488, Cl. 204-157.150.

Crabtree, Samuel B.: *See*—
Kiesche, Eric A.; and Crabtree, Samuel B., 4,873,753, Cl. 29-157.30R.

Crank, Sue E.: *See*—
Jucha, Rhett B.; Carter, Duane E.; Davis, Cecil J.; and Crank, Sue E., 4,874,723, Cl. 437-245.000.

Crawford, Duane A.: *See*—
Avant, Odis L.; and Crawford, Duane A., 4,873,977, Cl. 128-334.00R.

Crawford Fitting Company: *See*—
Johnston, Lonnie E., 4,873,755, Cl. 29-237.000.

Crawford, Thomas C.; Keely, Stanley L.; Larson, David L.; Lombardino, Joseph G.; and Maciejko, James J., to Pfizer Inc. Antinflammatory compositions and methods. 4,874,757, Cl. 514-226.500.

Creative Athletic Products and Services, Inc.: *See*—
Wright, Robert L., 4,874,168, Cl. 273-26.00C.

Crick, David L.; and Hayes, James K., to Combustion Engineering, Inc. Bar support shim and method. 4,874,041, Cl. 165-162.000.

Cringle, Stephen J., to Lions Eye Inst. of Western Australia. Electroretinogram apparatus. 4,874,237, Cl. 351-221.000.

Crispoldi, Antonio; Moriconi, Andrea; and Chiappafreddo, Mario, to Enichem Agricoltura S.p.A.; CCM S.r.l.; and Tecnocentro S.r.l. Process for producing calcium-urea nitrate. 4,874,595, Cl. 423-397.000.

Crosswhite, Lola E.: *See*—
Hill, Francis V.; and Crosswhite, Lola E., 4,874,648, Cl. 428-35.900.

Crown Crafts, Inc.: *See*—
Sapp, William M.; and Harrell, Julia E., 4,873,736, Cl. 5-434.000.

Crozat, Georges: *See*—
Payre, Didier; Crozat, Georges; and Spinner, Bernard, 4,873,842, Cl. 62-480.000.

Cryopharm Corporation: *See*—
Goodrich, Raymond P., Jr.; Williams, Christine M.; Franco, Robert S.; and Weiner, Murray, 4,874,690, Cl. 435-2.000.

Culp, Gordon W.: *See*—
Voss, David L.; DeCamp, Howard S.; and Culp, Gordon W., 4,874,930, Cl. 219-522.000.

Cummins Engine Company, Inc.: *See*—
Hixon, Charles E., 4,874,047, Cl. 175-369.000.

Curiel Contreras, Jorge H.: *See*—
Thompson, Marvin W.; Jennings, Timothy C.; Scott, James A.; Phenicie, Ronald W.; Murphy, Margaret H.; Nakash, Gabriel D.; Biggers, James R.; Boudreau, Lynnlee M.; and Curiel Contreras, Jorge H., 4,874,266, Cl. 403-407.100.

Curran, Kenneth J.: *See*—
Baer, Ralph H.; Curran, Kenneth J.; and Smith, Jay, III, 4,875,096, Cl. 358-143.000.

Curths, Gary, to McInerney Incorporated. Air injection pipe assembly and method of making. 4,873,823, Cl. 60-293.000.

Curtis, Robert A., to Digital Equipment Corporation. Twisted pair adapter. 4,875,223, Cl. 375-36.000.

Cusack, Michael D., to United Technologies Corporation. Variable pitch IC bond pad arrangement. 4,875,138, Cl. 174-52.400.

Cuschera, Casper. Disengagable ring fitting for a toilet. 4,873,730, Cl. 4-252.00R.

Custro, Sergio: *See*—
Agostinis, Enrico; Custro, Sergio; and Zazzetta, Alessandro, 4,874,821, Cl. 525-271.000.

Cybela, Jeffrey J., to Square D Company. Programmable controller capacitor and battery backed ram memory board. 4,874,960, Cl. 307-64.000.

Daggett, Kenneth E.; Onaga, Eimei M.; Casler, Richard J., Jr.; and Johnson, Richard A., to Unimation, Inc. Digital robot control providing pulse width modulation for a brushless DC drive. 4,874,997, Cl. 318-568.100.

Dahowski, Donald E., to Quaker Plastic Corporation. Plastic module rigidizing system. 4,873,802, Cl. 52-184.000.

Daiichi Seiyaku Co., Ltd.: *See*—
Kobayashi, Setsuo; Nakazawa, Tsugio; Yoshie, Yasumasa; Abiko, Yasushi; and Kameda, Kinya, 4,874,772, Cl. 514-341.000.

Daimler-Benz Aktiengesellschaft: *See*—
Roller, Traugott, 4,874,198, Cl. 296-192.000.

Dainippon Ink and Chemicals, Inc.: *See*—
Takagaki, Hidetsugu; Abe, Masayoshi; Watanabe, Michihiro; Takeuchi, Kazuyuki; Nakanishi, Shigenori; Nakata, Yuuko; and Yamazaki, Keiji, 4,874,855, Cl. 540-3.000.

Dairy Equipment Co.: *See*—
Pulvermacher, Ronald J., 4,873,943, Cl. 119-14.160.

Dalzell, David T., to Logic Replacement Technology, Limited. Electronic pulse time measurement apparatus. 4,875,201, Cl. 368-120.000.

D'Ambra, Thomas E.; and Bell, Malcolm R., to Sterling Drug Inc. 4-arylcarbonyl-1-[(4-morpholinyl)-lower-alkyl]-1H-indoles. 4,874,761, Cl. 514-235.200.

D'Amelio, Frank D.: *See*—
Morris, David L.; Filip, Mihail; D'Amelio, Frank D.; Esposito, Dominick G.; and Quint, Robert H., 4,874,364, Cl. 604-35.000.

Damon, Gerald D.; and Godlew, David P., to Eaton Corporation. Torsional vibration damping mechanism. 4,874,074, Cl. 192-106.200.

Dana Corporation: *See*—
Gall, Ray A., 4,874,349, Cl. 464-14.000.

Dandan, Issa R.: *See*—
Linke, Thomas A.; Dandan, Issa R.; Livingston, Troy W.; and Wilkerson, Alan W., 4,873,792, Cl. 51-165.800.

Danforth, Richard L.: *See*—
George, Eric R.; Danforth, Richard L.; and Byrd, Paul S., 4,874,801, Cl. 523-214.000.

Daniele, Vincenzo; Monti, Marco M.; Taliercio, Michele; and Capocelli, Piero, to SGS-Thomson Microelectronics s.r.l. Analog integrated circuit having intrinsic topologies and characteristics selectable by a digital control. 4,875,020, Cl. 330-307.000.

Danieli & C. Officine Meccaniche SpA: *See*—
Giancarlo, Cristiani, 4,873,857, Cl. 72-257.000.

Danieli, Guido. Flexible endoscope. 4,873,965, Cl. 128-6.000.

Daniels, Steven D.; Maslanka, Daniel C.; and Morse, John E., to Eastman Kodak Company. Head transport assembly having simplified mutually independent positional adjustments. 4,875,122, Cl. 360-109.000.

Dankowski, Manfred; and Hofen, Willi, to Degussa Aktiengesellschaft. Process for the desensitization of water-insoluble peroxycarboxylic acids. 4,874,556, Cl. 562-2.000.

Dannenberg, Robert D., to Navistar International Transportation Corp. Time multiplexed control of air core gauges from a microprocessor address/data bus. 4,875,041, Cl. 340-870.130.

Dartois, Robert: *See*—
Egee, Michel; Dartois, Robert; Marx, Jean; Merienne, Etienne; Regalia, Marcel; Poplimont, Philippe; and Van Schel, Etienne, 4,875,175, Cl. 364-551.010.

Data Card Coprporation: *See*—
Younger, Thomas L., 4,874,935, Cl. 235-492.000.

Daubenbuchel, Werner; and Jira, Alfred, to Krupp Kautex Maschinenbau GmbH. Process for producing hollow bodies of thermoplastic material. 4,874,649, Cl. 428-36.500.

David R. Webb Co., Inc.: *See*—
Weil, George, 4,874,003, Cl. 134-111.000.

Davis, Cecil J.: *See*—
Jucha, Rhett B.; Carter, Duane E.; Davis, Cecil J.; and Crank, Sue E., 4,874,723, Cl. 437-245.000.

Davis Meditech: *See*—
Harris, Arthur, 4,873,877, Cl. 73-864.160.

Davis Newgard Revocable Family Living Trust: *See*—
Newgard, Kent W.; and Gordon, Mark G., 4,874,377, Cl. 604-167.000.

Davis, Robert B.; Kramer, Charles E.; and Barlow, Sandra K., to Albany Research (UK) Limited. Paper machine felts. 4,874,660, Cl. 428-234.000.

Davru Manufacturing Ltd.: *See*—
Archer, David, 4,875,228, Cl. 378-197.000.

Dawson, Geoffrey G.; and Williams, Michael K., to Procter & Gamble Company, The. Toilet soap bar compositions containing water soluble polymers. 4,874,538, Cl. 252-117.000.

Day, James L., to James L. Day Co., Inc. Air flow metering terminal and control system. 4,873,873, Cl. 73-861.630.

De Erven De Weduwe J. Van Nelle B.V.: *See—*
Piscaer, Petrus J. C., 4,873,916, Cl. 99-289.00R.
Dean, Dave: *See—*
Miner, Jay G.; Dean, Dave; Decuir, Joseph C.; Nicholson, Ronald H.; and Tanaka, Akio, 4,874,164, Cl. 273-1.00E.
Deane, Peter, to Xicor, Inc. Low power voltage clamp circuit. 4,874,967, Cl. 307-296.800.
Deasy, Patrick B., to Hoechst Aktiengesellschaft. Multi-component long-acting medicament formulation for implantation. 4,874,612, Cl. 424-425.000.
DeCamp, Howard S.: *See—*
Voss, David L.; DeCamp, Howard S.; and Culp, Gordon W., 4,874,930, Cl. 219-522.000.
Decker, John A., Jr.; Decker, Linda M.; and Halford, Christopher J., to Kuau Technology, Ltd. Composite-materials acoustic stringed musical instrument. 4,873,907, Cl. 84-291.000.
Decker, Linda M.: *See—*
Decker, John A., Jr.; Decker, Linda M.; and Halford, Christopher J., 4,873,907, Cl. 84-291.000.
Decuir, Joseph C.: *See—*
Miner, Jay G.; Dean, Dave; Decuir, Joseph C.; Nicholson, Ronald H.; and Tanaka, Akio, 4,874,164, Cl. 273-1.00E.
Dedole, Pascal: *See—*
Guerendel, Philippe; Naville, Charles; Laurent, Jean; and Dedole, Pascal, 4,874,060, Cl. 181-102.000.
Deglin, Richard N.: *See—*
Frimmel, James J., Jr.; Ouellette, Thomas; and Deglin, Richard N., 4,875,157, Cl. 364-200.000.
Degryse, Anne-Dominique A. Y.: *See—*
Ooms, Leo A. A.; and Degryse, Anne-Dominique A. Y., 4,874,766, Cl. 514-258.000.
De Guglielmi, Giorgio: *See—*
Chiavetta, Sebastiano R.; and De Guglielmi, Giorgio, 4,874,163, Cl. 272-53.200.
Degussa Aktiengesellschaft: *See—*
Dankowski, Manfred; and Hofen, Willi, 4,874,556, Cl. 562-2.000.
Kiss, Akos; Kleinschmit, Peter; Hanich, Juergen; Halbritter, Guenter; and Horst, Jenny, 4,874,433, Cl. 106-450.000.
Dehne, Axel G., to Hughes Aircraft Company. Cryogenic refrigerator employing counterflow passageways. 4,873,831, Cl. 62-6.000.
DeJong, Allan W.; and Perry, Paul D., to Siemens-Bendix Automotive Electronics Limited. Heater control valve. 4,874,010, Cl. 137-484.400.
Delatorre, Leroy C., to Panex Corporation. Micro displacement force transducer. 4,873,870, Cl. 73-733.000.
Delpech, Guy; and Garnier, Gilles, to U.S. Philips Corporation. Support for printed circuit boards. 4,875,140, Cl. 361-412.000.
Delta International Machinery Corp.: *See—*
Luttmer, David J.; Panian, Thomas L.; Wixey, Barry D.; and Wilson, Raymond L., 4,873,770, Cl. 33-706.000.
Den Boef, Arie J., to U.S. Philips Corp. Arrangement for optically measuring a distance between a surface and a reference plane. 4,874,246, Cl. 356-375.000.
Denne, William. X-ray laser. 4,875,214, Cl. 372-5.000.
De Peuter, Willem L. G.: *See—*
Koster, Marinus P.; Bouwens, Henricus J. J.; Van Tartwijk, Anton A. J.; and De Peuter, Willem L. G., 4,874,286, Cl. 414-744.500.
Derhaag, Robert L.; and Rose, David B. Headset construction and method of making same. 4,875,233, Cl. 379-430.000.
Derks, Christopher S.: *See—*
Frenkel, Robert L.; Derks, Christopher S.; and Armstrong, Donald L., 4,874,079, Cl. 198-436.000.
Desai, Rohit: *See—*
Youssefyeh, Raymond; Chakraborty, Utpal; Magnien, Ernest; Desai, Rohit; and Lee, Thomas D-Y, 4,874,769, Cl. 514-314.000.
DeSanti, Raymond J., to Brintec Corporation. Fiber optic faceplate assembly. 4,874,904, Cl. 174-53.000.
Desecki, Vince: *See—*
Kulle, Lee; Desecki, Vince; and Hess, John M, III, 4,874,369, Cl. 604-86.000.
Desmarteu, Darryl D.: *See—*
Navarrini, Walter; and Desmarteu, Darryl D., 4,874,875, Cl. 548-959.000.
Dessanti, Daniel J.; and Schorr, Hans P., to Brooklyn Union Gas Company, The. Combustion-powered compound refrigeration system. 4,873,839, Cl. 62-238.600.
Detlev, Joachimi: *See—*
Yong, Bak G.; Petra, Barth; Dietrich, Demus; Detlev, Joachimi; Kampa, Barbara; Kohler, Saskia; Mohr, Kristine; Paschke, Reinhard; Pelzl, Gerhard; Rosenfeld, Ulrich; Schafer, Wolfgang; Scherf, Klaus-Dieter; Tschirske, Carsten; Weissflog, Wolfgang; and Zaschke, Horst, 4,874,544, Cl. 252-299.610.
Dewberry, Larry S.; and Schlipp, Richard H., to Waukesha Rubber Company, Inc. Apparatus and method for mounting a resilient finger to a poultry plucking apparatus or the like. 4,873,747, Cl. 17-11.10R.
Dhar, Manmohan, to Mechanical Technology Incorporated. Control scheme for power modulation of a free piston Stirling engine. 4,873,826, Cl. 60-641.140.
Diabrasive International Ltd.: *See—*
Ishak, Maher; and Schwartz, Alexander, 4,874,478, Cl. 204-16.000.
Diatec Polymers: *See—*
Sortwell, Edwin T.; Slovinsky, Manuel; and Mikkelsen, Alan R., 4,874,588, Cl. 422-269.000.
Dickenson, Wilk A. Electrically heated hose assembly for conveying electrically conductive liquids. 4,874,925, Cl. 249-301.000.
Dickstein, Heidi L.; Hiraoka, Hiroyuki; and Lee, James H., to International Business Machines Corporation. Thin film magnetic heads with thermally crosslinked insulation. 4,875,124, Cl. 360-126.000.
DIEHL GmbH & Co.: *See—*
Rudenauer, Werner, 4,873,927, Cl. 102-269.000.
Diesch, Ronald W.: *See—*
Collins, Marcus H.; and Diesch, Ronald W., 4,874,068, Cl. 192-18.00A.
Dietrich, Demus: *See—*
Yong, Bak G.; Petra, Barth; Dietrich, Demus; Detlev, Joachimi; Kampa, Barbara; Kohler, Saskia; Mohr, Kristine; Paschke, Reinhard; Pelzl, Gerhard; Rosenfeld, Ulrich; Schafer, Wolfgang; Scherf, Klaus-Dieter; Tschirske, Carsten; Weissflog, Wolfgang; and Zaschke, Horst, 4,874,544, Cl. 252-299.610.
Digital Equipment Corporation: *See—*
Brown, John F., III, 4,875,160, Cl. 364-200.000.
Curtis, Robert A., 4,875,223, Cl. 375-36.000.
Hertrich, Friedrich R., 4,874,975, Cl. 310-186.000.
Dillard, Robert D.: *See—*
Carr, F. Patrick; Dillard, Robert D.; and McCullough, Doris E., 4,874,777, Cl. 514-381.000.
Dillon, Raymond J. Safety tie down bar hand grip system. 4,873,742, Cl. 16-111.00R.
Dirks, Clara. Doll with changeable hair piece. 4,874,345, Cl. 446-394.000.
DiSapio, Alfred J.; Pfister, William R.; and Sheeran, Mary A., to Dow Corning Corporation. Multi-laminate fragrance release device. 4,874,129, Cl. 239-36.000.
Discovery Toys, Inc.: *See—*
Klitsner, Daniel B., 4,874,342, Cl. 446-168.000.
Ditl, Pavel: *See—*
Kabatek, Jan; and Ditl, Pavel, 4,874,249, Cl. 366-339.000.
Ditlinger, Richard J., to Allied-Signal Inc. Tie bar with internal lubrication. 4,873,889, Cl. 74-579.00R.
Divanji, Haresh S.: *See—*
Mikhlin, Josef A.; Capes, C. Edward; Divanji, Haresh S.; and Coleman, Richard D., 4,874,393, Cl. 44-20.000.
Djordjevich, Ljubomir; and Ivankovich, Anthony K. Noninvasive continuous monitor of arterial blood pressure waveform. 4,873,987, Cl. 128-672.000.
Dobnick, Dennis A., to QSE Sales & Management, Inc. Notch gap transformer and lighting system incorporating same. 4,874,990, Cl. 315-276.000.
Doheny, Anthony J., to Kendall Company, The. Heat shrinkable wraps. 4,874,665, Cl. 428-345.000.
Doi, Kunio: *See—*
Fencil, Laura E.; Metz, Charles E.; and Doi, Kunio, 4,875,165, Cl. 364-413.220.
Dola, Frank P.; Feldman, Steven; and Erwin, John K., to AMP Incorporated. Surface applied wiring apparatus. 4,874,322, Cl. 439-210.000.
Donnally, Leroy C.: *See—*
Atlas, George N.; Donnally, Leroy C.; Urban, Donald P.; Perkins, James M.; and Wilson, Timothy C., 4,874,308, Cl. 425-544.000.
Donovan, Joseph C.; and Ahmed, Bashir M., to Henkel Corporation. Use of fugitive plasticizer in autodepositing composition. 4,874,673, Cl. 428-463.000.
Donzis, Byron A. Impact absorbing composites and their production. 4,874,640, Cl. 427-421.000.
Dorge, Udo: *See—*
Andra, Rainer; Kurr, Klaus; Ullrich, Gunter; and Dorge, Udo, 4,873,887, Cl. 74-573.00F.
Dornish, John M.: *See—*
Borretzen, Bernt; Larsen, Rolf O.; Pettersen, Erik O.; Dornish, John M.; and Oftebro, Rolf, 4,874,780, Cl. 514-452.000.
Dost, Martin H.; Hopner, Emil; Melas, Constantin M.; and Provazek, Lionel D., to International Business Machines Corporation. Compound pulse dimming circuitry for conditioning readback signals. 4,875,112, Cl. 360-65.000.
Dow Chemical Company, The: *See—*
Bubeck, Robert A.; Clipper, Robert B.; and Henton, David E., 4,874,815, Cl. 525-71.000.
Chau, C. C.; and Im, Jang-hi, 4,874,568, Cl. 264-49.000.
Grant, Charles B., 4,874,886, Cl. 560-70.000.
Jeanes, Thomas O., 4,874,401, Cl. 55-16.000.
Kleschick, William A.; Secor, Jacob; and Holmsen, Theodore W., 4,874,421, Cl. 71-9.00H.
Larson, Paul A.; Aldrich, Dale J.; and Berman, Jody R., 4,874,669, Cl. 428-416.000.
Wilson, Wilfred W.; Polemenakos, Sotiros C.; Potter, J. Larry; Mangold, Donald J.; Harlowe, William W.; and Schlameus, Herman W., 4,874,611, Cl. 424-410.000.
Dow Corning Corporation: *See—*
DiSapio, Alfred J.; Pfister, William R.; and Sheeran, Mary A., 4,874,129, Cl. 239-36.000.
Fey, Kenneth C.; Freiberg, Alan L.; and Price, John G., 4,874,431, Cl. 106-2.000.
Lee, Chi-Long; and Willis, Robin L., Jr., 4,874,667, Cl. 428-402.220.
Narula, Dipak, 4,874,547, Cl. 252-312.000.
Downey, Ernest L. Replacement disc. 4,874,389, Cl. 623-17.000.
Drane, John H., to Duracell Inc. Flashlight bulb mounting. 4,875,146, Cl. 362-202.000.
Draxelmayr, Dieter, to Siemens Aktiengesellschaft. Current mirror circuit assembly. 4,875,018, Cl. 330-288.000.
Drent, Eit, to Shell Oil Company. Catalyst compositions and processes for polymerizing carbon monoxide and olefinically unsaturated hydrocarbons. 4,874,736, Cl. 502-165.000.

Dresser Industries, Inc.: *See—*
Kleeb, Thomas R.; and Wishon, Berhl E., 4,874,726, Cl. 501-124.000.
Du Pont Canada Inc.: *See—*
Legault, Clayton M., 4,874,390, Cl. 8-149.100.
DuBois Chemicals, Inc.: *See—*
Steimel, Lyle H.; and Christensen, Ronald J., 4,874,541, Cl. 252-178.000.
Duchateau, Jacques: *See—*
Gravisse, Philippe; Duchateau, Jacques; and Perron, Maurice, 4,874,188, Cl. 283-89.000.
Duerselen, Roderich: *See—*
Reiche, Dieter; Thuerk, Matthias; and Duerselen, Roderich, 4,874,677, Cl. 428-605.000.
Dujardin, Ralf; Ebert, Wolfgang; Meyer, Rolf-Volker; Berg, Klaus; Grigo, Ulrich; and Wehnert, Wolfgang, to Bayer Aktiengesellschaft. Vinyl copolymers with grafted-on polycarbonate chains, their production and use. 4,874,816, Cl. 525-146.000.
Dumas, William V.: *See—*
Karas, Bradley R.; Foust, Donald F.; and Dumas, William V., 4,874,635, Cl. 427-96.000.
Duncia, John Jonas V.: *See—*
Aldrich, Paul E.; Duncia, John Jonas V.; and Pierce, Michael E., 4,874,867, Cl. 548-101.000.
Dunlop Limited: *See—*
Haines, Robert C., 4,874,570, Cl. 264-154.000.
Dunn, Charlton; Bremner, Robert J.; and Meng, Sen Y., to Rockwell International Corporation. Multiple discharge cylindrical pump collector. 4,874,575, Cl. 376-404.000.
Dunn, Joseph, Jr.: *See—*
Huang, Leeyuan; Koupal, Lawrence; Dunn, Joseph, Jr.; Liesch, Jerrold M.; Hensens, Otto; and Woodruff, H. Boyd, 4,874,745, Cl. 514-18.000.
Duphar International Research B.V.: *See—*
Van Wijngaarden, Ineke; Kruse, Cornelis; Van Der Heyden, Johannes A. M.; and Tulp, Martinus T. M., 4,874,770, Cl. 514-326.000.
Du Pont de Nemours, E. I., and Company: *See—*
Aldrich, Paul E.; Duncia, John Jonas V.; and Pierce, Michael E., 4,874,867, Cl. 548-101.000.
Hallam, Donald E.; Popper, Peter; Staunton, Harold F.; Taylor, Robert E.; and Yngve, Paul W., 4,873,821, Cl. 57-293.000.
Hasircoglu, Alexander W., 4,874,319, Cl. 439-108.000.
Inskip, Harold K.; and Waggoner, Marion G., 4,874,817, Cl. 525-183.000.
Kirkland, Joseph J.; and Kohler, Jurgen, 4,874,518, Cl. 210-502.100.
McKinney, Ronald J.; and Osborne, Robert B., 4,874,884, Cl. 558-338.000.
Duracell Inc.: *See—*
Drane, John H., 4,875,146, Cl. 362-202.000.
Durbin, Richard D.; Lukens, Jean H.; Uchytil, Thomas F.; and Rhodehamel, Nicholas, to Wisconsin Alumni Research Foundation. Manufacture and use of tagetitoxin. 4,874,706, Cl. 435-253.300.
Durkee Industrial Foods Corporation: *See—*
Loughrin, Thomas D., 4,874,621, Cl. 426-124.000.
Dyer, Paul N.: *See—*
Garg, Diwaker; Klucher, Beth A.; Dyer, Paul N.; Kidd, Richard W.; and Ceccarelli, Christopher, 4,874,642, Cl. 427-249.000.
Dyke, Denis G., to American Sterilizer Company. Self-seal sterilization pouch. 4,874,090, Cl. 206-439.000.
Dysarz, Edward D. Semi submersible device and method of transporting a marine superstructure and placing it onto or removing it from a marine structure. 4,874,269, Cl. 405-209.000.
Dzjuban, Vitaly S.; Sazhin, Alexandr D.; Zhitnikov, Valery K.; and Konoplyanko, Anatoly I. Device for remote control of electrical apparatus. 4,875,040, Cl. 340-825.060.
E.M.M. Emiliana Macchine Maglieria S.r.l.: *See—*
Stoppazzini, Benito, 4,873,845, Cl. 66-126.00R.
E. R. Squibb and Sons, Inc.: *See—*
Heaketh, Mark L., 4,874,380, Cl. 604-180.000.
Eagle Electric Manufacturing Co., Inc.: *See—*
Munroe, Ronald G., 4,874,332, Cl. 439-462.000.
Easterly, Robert W.: *See—*
Bridges, Mark E.; Easterly, Robert W.; and Fredlund, John R., 4,875,103, Cl. 358-214.000.
Eastman Dental Center: *See—*
Featherstone, John D. B.; Cooper, Lyndon F.; Myers, Michael L.; and Nelson, Dennis G. A., 4,874,315, Cl. 433-215.000.
Eastman Kodak Company: *See—*
Bridges, Mark E.; Easterly, Robert W.; and Fredlund, John R., 4,875,103, Cl. 358-214.000.
Daniels, Steven D.; Maslanka, Daniel C.; and Morse, John E., 4,875,122, Cl. 360-109.000.
Eikenberry, Jon N., 4,874,692, Cl. 435-7.000.
Favrou, John M.; Lacey, Christopher A.; and Brock, George W., 4,875,129, Cl. 360-122.000.
Gunther, Wolfgang H. H.; Leone, Ronald E.; and Przyklek, Rosemary, 4,874,866, Cl. 548-100.000.
Hediger, Edwin A.; Ng, Yee S.; and Pham, Hieu, 4,875,057, Cl. 346-107.00R.
Hons, Douglas A., 4,875,153, Cl. 346-155.000.
Keep, Gerald T., 4,874,809, Cl. 524-449.000.
McCann, James D.; Young, Lawrence R.; and Brandon, John M., 4,875,055, Cl. 346-75.000.
McClure, Richard J., 4,875,127, Cl. 360-130.210.
Rakov, David M., 4,875,062, Cl. 346-159.000.
Resch, William A., III; and Moak, Jonathan E., 4,875,078, Cl. 355-246.000.
Easton, Brian C.; and Whiffin, Peter A. C., to U.S. Philips Corp. Vapor phase deposition of cadmium and mercury telluride for electronic device manufacture. 4,874,634, Cl. 427-54.100.
Eaton Corporation: *See—*
Collins, Marcus H.; and Diesch, Ronald W., 4,874,068, Cl. 192-18.00A.
Damon, Gerald D.; and Godlew, David P., 4,874,074, Cl. 192-106.200.
Edelen, Stephen A.; Allen, David T.; and Zylman, Bill E., 4,873,881, Cl. 74-336.00R.
Goscenski, Edward J., Jr., 4,873,882, Cl. 74-411.000.
Leveque, Denis J., 4,875,009, Cl. 324-208.000.
Mohan, Robert J.; and O'Neil, Walter K., 4,874,072, Cl. 192-58.00B.
Nellums, Richard A.; and Braun, Eugene R., 4,874,070, Cl. 192-0.052.
Parrish, Timothy L., 4,874,911, Cl. 200-6.00R.
Thompson, Michael B., 4,873,836, Cl. 62-158.000.
Ebert, Wolfgang: *See—*
Dujardin, Ralf; Ebert, Wolfgang; Meyer, Rolf-Volker; Berg, Klaus; Grigo, Ulrich; and Wehnert, Wolfgang, 4,874,816, Cl. 525-146.000.
EBSCO Industries, Inc.: *See—*
Gudermuth, Clyde S., Jr., 4,873,782, Cl. 43-42.150.
Ecanow, Bernard: *See—*
Ecanow, Charles S.; and Ecanow, Bernard, 4,874,742, Cl. 514-2.000.
Ecanow, Charles S.; and Ecanow, Bernard, to Synthetic Blood Corporation. Synthetic whole blood and a process for preparing the same. 4,874,742, Cl. 514-2.000.
Eck, Herbert; Fleischmann, Gerald; Prasse, Alfred; and Kolbig, Kunigunde, to Wacker-Chemie GmbH. Process for improving the adhesion of polymeric substances. 4,874,638, Cl. 427-222.000.
Eckenhoff, James B.: *See—*
Wong, Patrick S. L.; Theeuwes, Felix; and Eckenhoff, James B., 4,874,388, Cl. 604-891.100.
Ecolab Inc.: *See—*
Greenwald, Richard B.; Liu, Chung-Tsing; and McDonell, James A., 4,874,540, Cl. 252-174.240.
Eda, Hiroshi: *See—*
Chikuma, Isamu; Shimada, Satoru; and Eda, Hiroshi, 4,874,183, Cl. 280-91.000.
Edahiro, Takeshi: *See—*
Kijima, Takao; and Edahiro, Takeshi, 4,874,185, Cl. 280-690.000.
Edelen, Stephen A.; Allen, David T.; and Zylman, Bill E., to Eaton Corporation. Electrically actuated x-y shifting mechanism. 4,873,881, Cl. 74-336.00R.
Eden, James L.; Kasica, James J.; and Zallie, James P., to National Starch and Chemical Corporation. Process for the manufacture of cast jelly gum confectionaries. 4,874,628, Cl. 426-578.000.
Edwards, Bryant, to Marpam International, Inc. Hypodermic jet injector and cartridge therefor. 4,874,367, Cl. 604-72.000.
Egan, Philip D., to Reinforced Earth Comany, The. Cantilever retaining wall system using discrete precast facing panels. 4,874,272, Cl. 405-284.000.
Egawa, Hidemitsu; Aoki, Riichirou; and Okumura, Katsuya, to Kabushiki Kaisha Toshiba. Semiconductor device having a backplate electrode. 4,875,088, Cl. 357-67.000.
Egawa, Toshihiko: *See—*
Tahara, Kazutoki; and Egawa, Toshihiko, 4,874,671, Cl. 428-447.000.
Egbert, David C.: *See—*
Seaborne, Jonathan; and Egbert, David C., 4,874,618, Cl. 426-76.000.
Egea, Noel; and Olive, Corinne, to Societe Compagnie Generale Textile Cogetex. Apparatus for the inspection of tubular textile products. 4,874,241, Cl. 356-238.000.
Egee, Michel; Dartois, Robert; Marx, Jean; Merienne, Etienne; Regalia, Marcel; Poplimont, Philippe; and Van Schel, Etienne, to Universite de Reims Champagne-Ardenne. Method and device for analyzing and measuring physical parameters of a layered material by thermal radiometry. 4,875,175, Cl. 364-551.010.
Egense, Andrea L. F.; and Kuenzly, John D., to TRW Inc. Sulfur removal by sorbent injection in secondary combustion zones. 4,873,930, Cl. 110-345.000.
Ehlert, George E. Economical house air cooling arrangement. 4,874,038, Cl. 165-48.100.
Eickhoff, Robert D.: *See—*
Fingerson, Conrad F.; Carlson, Dennis L.; Nelson, Bruce A.; and Eickhoff, Robert D., 4,874,180, Cl. 273-416.000.
Eikenberry, Jon N., to Eastman Kodak Company. Binder composition and analytical element having stabilized peroxidase in layer containing the composition. 4,874,692, Cl. 435-7.000.
Eilliott, Donald R.; and Beall, Gary W., to United Catalyst Inc. Organophilic clay modified with silane compounds. 4,874,728, Cl. 501-148.000.
Einzig, Robert E., to Optical Technologies, Inc. Fluid flow sensing apparatus for in vivo and industrial applications employing novel optical fiber pressure sensors. 4,873,989, Cl. 128-692.000.
Eisai Co., Ltd.: *See—*
Ueda, Kouichiro; Tanaka, Satoru; Kunii, Toshinobu; Kagei, Kengo; Sato, Tadashi; Ono, Hideki; Ohtsuka, Issei; Kawase, Mayumi; Ohgoh, Toshiharu; and Wakabayashi, Tsuneo, 4,874,869, Cl. 548-309.000.

Eisen, Herman N.: *See*—
Saito, Haruo; Kranz, David M.; Eisen, Herman N.; and Tonegawa, Susumu, 4,874,845, Cl. 530-395.000.

Eisenberg, Gerd, to BTS Broadcast Television Systems GmbH. Control circuit for a controller for use with a controlled element. 4,874,994, Cl. 318-257.000.

Eitner, Detlef: *See*—
Gethke, Hans-Gerd; Eitner, Detlef; and Engelhard, Friedel, 4,874,133, Cl. 239-555.000.

Eke, Kenneth I, to Microwave Ovens Limited. Microwave ovens and methods of defrosting food therein. 4,874,914, Cl. 219-10.55M.

Eklund, Robert H., to Texas Instruments Incorporated. Method of making laterally oriented Schottky diode. 4,874,714, Cl. 437-39.000.

Ektelon: *See*—
Zech, Ronald G., 4,874,170, Cl. 273-73.00A.

Electric Power Research Institute: *See*—
Hadano, Yoshikazu; Tsunoda, Eiji; and Kajigaya, Ichiro, 4,873,827, Cl. 60-646.000.

Eli Lilly and Company: *See*—
Baker, Patrick J., 4,874,843, Cl. 530-317.000.
Bonjouklian, Rosanne; Meade, Christopher J. M.; Mihelich, Edward D.; and Phillips, Michael L., 4,874,782, Cl. 514-473.000.
Carr, F. Patrick; Dillard, Robert D.; and McCullough, Doris E., 4,874,777, Cl. 514-381.000.
Jaskunas, S. Richard, 4,874,703, Cl. 435-252.330.
Krumkalns, Eriks V.; and Smiley, David L., 4,874,775, Cl. 514-357.000.

Elias, William E.: *See*—
Oldham, Susan L.; Elias, William E.; Bigus, Stephen J.; and Lau, Kreisler S. Y., 4,874,643, Cl. 427-340.000.

Elkin, Alfred A.; and Costa, Sylvestre M., to Plastic Development, Inc. Method of making a jewelry display card. 4,874,446, Cl. 156-66.000.

Ellem Industria Farmaceutica S.p.A.: *See*—
Brunetti, Brunetto; and Prada, Marco, 4,874,844, Cl. 530-331.000.

Ellinger, Sylvester M.: *See*—
Spillman, William B., Jr.; Rudd, Robert E., III; Ellinger, Sylvester M.; Patriquin, Douglas R.; and Kline, Bruce R., 4,874,245, Cl. 356-364.000.

Elliott, Michael; Janes, Norman F.; and Khambay, Bhupinder P. S., to National Research Development Corporation. Pesticides. 4,874,781, Cl. 514-463.000.

Elliott, William A.; Greene, Richard A.; Kennedy, Robert P.; Poe, Robert P., Jr.; and Steece, William H., to American Telephone and Telegraph Company, AT&T-Technologies Inc. Component insertion machine apparatus. 4,873,762, Cl. 29-809.000.

Ellison, Arthur E. Tissue retractor. 4,874,375, Cl. 604-164.000.

Ellison, Larry J.; and Smelcer, John R., to Adams, Leonard G., a part interest. Scope mount base for a black powder rifle. 4,873,779, Cl. 42-101.000.

Ellsworth, Daniel L.; and Moll, Maurice M., to NCR Corporation. Two transistor full wave rectifier. 4,875,151, Cl. 363-127.000.

Elopak Systems AG: *See*—
Nesse, Knut O., 4,874,355, Cl. 493-148.000.

Emori, Shinji: *See*—
Miyauchi, Akira; Nishimoto, Hiroshi; Okiyama, Tadashi; Kitasagami, Hiroo; Sugimoto, Masahiro; Tamada, Haruo; and Emori, Shinji, 4,875,087, Cl. 357-71.000.

Empi, Inc.: *See*—
Maurer, Donald D., 4,873,996, Cl. 128-844.000.

Endo, Katsunori: *See*—
Minamisawa, Tsuyoshi; Endo, Katsunori; Ikegami, Eitaro; and Nezu, Shigeru, 4,874,800, Cl. 523-205.000.

Endo, Shuichi: *See*—
Ishikawa, Toyoji; Kaneko, Toshio; Endo, Shuichi; Ogata, Yoshihiro; and Takaya, Toshihiko, 4,873,940, Cl. 118-651.000.

Endo, Toshihiko; and Matsunaga, Nobuyuki, to Polyplastics Co., Ltd. Self-lubricating thermoplastic resin wear part. 4,874,807, Cl. 524-267.000.

Endo, Yukio; and Harada, Nozomu, to Kabushiki Kaisha Toshiba. Solid state photovoltaic imaging device with excess charge eliminator. 4,875,101, Cl. 358-213.190.

Endo, Zenichiro: *See*—
Igarashi, Takao; Sugawara, Satoshi; Yoshimoto, Yuichiro; Saito, Shozo; Fukumoto, Takashi; Endo, Zenichiro; and Shinbo, Katsutoshi, 4,874,574, Cl. 376-333.000.

Energy Innovations, Inc.: *See*—
Pruszenski, Anthony S., Jr., 4,874,225, Cl. 350-259.000.

Engel, William K.: *See*—
Avery, Bennett W.; and Engel, William K., 4,873,894, Cl. 74-785.000.

Engelhard, Friedel: *See*—
Gethke, Hans-Gerd; Eitner, Detlef; and Engelhard, Friedel, 4,874,133, Cl. 239-555.000.

Engle, George M., to Stackpole Corporation, The. Plasma enhanced chemical vapor deposition wafer holding fixture. 4,873,942, Cl. 118-728.000.

Engle, Thomas H., to General Signal Corporation. Parking brake system for railway vehicles. 4,874,065, Cl. 188-265.000.

English Electric Company Limited, The: *See*—
Wood, Ian A.; and Horsfield, Edward A., 4,874,573, Cl. 376-272.000.

English, George J.; Rothwell, Harold L., Jr.; and Garrity, Donald F., Jr., to GTE Products Corporation. Pulsed metal halide arc discharge light source. 4,874,988, Cl. 313-620.000.

Enichem Agricoltura S.p.A.: *See*—
Crispoldi, Antonio; Moriconi, Andrea; and Chiappafreddo, Mario, 4,874,595, Cl. 423-397.000.

Enichem Elastomeri S.p.A.: *See*—
Agostinis, Enrico; Custro, Sergio; and Zazzetta, Alessandro, 4,874,821, Cl. 525-271.000.

Ensign, Harold W., to Cla-Val Co. Apparatus and method for separating water from aviation fuel, and float control therefor. 4,874,531, Cl. 210-744.000.

Epsilon Limited Partnership: *See*—
Goodwin, Dennis L.; Hawkins, Mark R.; Johnson, Wayne L.; Olsen, Aage; and Robinson, McDonald, 4,874,464, Cl. 156-646.000.

Erickson, Frederick L.: *See*—
Richeson, William E.; and Erickson, Frederick L., 4,873,948, Cl. 123-90.110.

Ernsting, Peter B.: *See*—
Castenmiller, Wilhelmus A. M.; Chesters, Allan K.; and Ernsting, Peter B., 4,874,626, Cl. 426-564.000.

Erwin, John K.: *See*—
Dola, Frank P.; Feldman, Steven; and Erwin, John K., 4,874,322, Cl. 439-210.000.

Esch, Hans W., to AVK Filtertechnik GmbH. Filter arrangement with pleat distance piece. 4,874,517, Cl. 210-493.500.

Eschmann, Heinz: *See*—
Tetenborg, Konrad; Eschmann, Heinz; and Huwelmann, Helmut, 4,873,815, Cl. 53-570.000.

Escolar, Carlos, to American Telephone and Telegraph Company, AT&T Bell Laboratories. Automatic rerouting of calls through data buses. 4,875,037, Cl. 340-825.010.

Eskelinen, Juhani, to Valmet Paper Machinery Inc. Short-dwell coater for coating a web with coating mix. 4,873,939, Cl. 118-410.000.

Esposito, Dominick G.: *See*—
Morris, David L.; Filip, Mihail; D'Amelio, Frank D.; Esposito, Dominick G.; and Quint, Robert H., 4,874,364, Cl. 604-35.000.

Ethyl Corporation: *See*—
Smith, Kim R.; Borland, James E.; and Sauer, Joe D., 4,874,784, Cl. 514-517.000.
Smith, Kim R.; Borland, James E.; and Sauer, Joe D., 4,874,785, Cl. 514-526.000.
Smith, Kim R.; Borland, James E.; and Sauer, Joe D., 4,874,788, Cl. 514-534.000.
Smith, Kim R.; Borland, James E.; and Sauer, Joe D., 4,874,789, Cl. 514-551.000.

Ethylene Corp.: *See*—
Sheridan, Michael; and Jaffe, Kenneth, 4,873,876, Cl. 73-863.860.

Etter, Robert M.; and Neumiller, Phillip J., to S. C. Johnson & Son, Inc. Plastic substrate having an adherent photo-product coating on its surface and a method of coating said plastic substrate. 4,874,672, Cl. 428-457.000.

Eumuco Aktiengesellschaft Fur Maschinenbau: *See*—
Werner, Eberhard, 4,873,860, Cl. 72-405.000.

Eustache, Jacques: *See*—
Shroot, Braham; Eustache, Jacques; Bernardon, Jean-Michel; and Nedoncelle, Philippe, 4,874,747, Cl. 514-23.000.

Evans, Samuel: *See*—
Stegmann, Werner; Meier, Hans R.; Evans, Samuel; Martin, Roger; and Luisoli, Reto, 4,874,885, Cl. 560-15.000.

Evyan, John J.; and Booth, Orville D., to Viskase Corporation. Burnished end shirred casing stick, method and apparatus. 4,873,748, Cl. 17-49.000.

Ex-Cell-O Corporation: *See*—
Preston, Frank J., 4,874,565, Cl. 264-37.000.

Exergen Corporation: *See*—
Pompei, Francesco; and Burke, Michael W., 4,874,253, Cl. 374-121.000.

Exxon Chemical Patents, Inc.: *See*—
Hazelton, Donald R.; and Hodgson, William J., Jr., 4,874,447, Cl. 156-167.000.
Tack, Robert D.; Andrews, Rodger F.; and Ayres, Sally J., 4,874,394, Cl. 44-70.000.

Exxon Research and Engineering Company: *See*—
Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., 4,874,820, Cl. 525-240.000.
LaFreniere, Lucie Y., 4,874,523, Cl. 210-651.000.

Eyemetrics-Systems AG: *See*—
Anger, Wilhelm; and Leuzinger, Christoph, 4,873,994, Cl. 128-774.000.

Ezaki, Hiroshi; Kobayashi, Yoneji; and Iida, Katsumi, to Bridgestone Corporation. Golf club set. 4,874,171, Cl. 273-77.00A.

F & B Mfg. Co.: *See*—
Safranek, Edward J., 4,873,962, Cl. 123-599.000.
Safranek, Edward J., 4,874,977, Cl. 310-269.000.

F. H. Papenmeier GmbH & Co. KG: *See*—
Bornschein, Hans-Jurgen, 4,875,185, Cl. 364-900.000.

Factor, Arnold: *See*—
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,874,783, Cl. 524-482.000.

Fairbanks, Bert L. Method of hydrostatic weighing and kit. 4,873,866, Cl. 73-437.000.

Fairbanks Inc.: *See*—
Strasser, Thomas F.; and Stott, Herbert L., 4,874,050, Cl. 177-134.000.

Fallon, Merton R.; and Clements, Thomas W., to McDantim, Inc. Gas blending apparatus. 4,874,116, Cl. 222-399.000.

Fantl, Andrew J.: *See*—
Holmes, Harlan K.; Moore, Thomas C., Jr.; and Fantl, Andrew J., 4,873,990, Cl. 128-748.000.
Farmer, Peter H.: *See*—
Cartier, George E.; and Farmer, Peter H., 4,874,814, Cl. 525-61.000.
Farooq, Saleem, to Ciba-Geigy Corporation. 1-carbamoyl-2-pyrazolines, composition containing them, and insecticidal and acaricidal method of using them. 4,874,778, Cl. 514-403.000.
Farris, Robert R.: *See*—
Purcell, Robert J.; and Farris, Robert R., 4,874,052, Cl. 180-9.100.
Favro, Lawrence D.: *See*—
Thomas, Robert L.; Kuo, Pao-Kuang; and Favro, Lawrence D., 4,874,251, Cl. 374-45.000.
Favrou, John M.; Lacey, Christopher A.; and Brock, George W., to Eastman Kodak Co. Inline magnetic head assembly for use in a cassette loaded recorder. 4,875,129, Cl. 360-122.000.
Fazl, Mahmood: *See*—
Walsh, David J.; Lougheed, William M.; Gentili, Fred; and Fazl, Mahmood, 4,873,975, Cl. 128-334.00R.
Featherstone, John D. B.; Cooper, Lyndon F.; Myers, Michael L.; and Nelson, Dennis G. A., to Eastman Dental Center. Method for bonding of restorative materials to a tooth. 4,874,315, Cl. 433-215.000.
Featherstone, John L.; Spang, S. Timothy; Newell, David G.; and Gallup, Darrell L., to Union Oil Company of California. Process and apparatus for reducing the concentration of suspended solids in clarified geothermal brine. 4,874,529, Cl. 210-713.000.
Feeney, Robert K.: *See*—
Hughes, David W.; Feeney, Robert K.; and Hertling, David R., 4,874,711, Cl. 437-8.000.
Fehlmann, Wolfgang; Hofer, Gerald; Junger, Dieter; Karle, Anton; and Laufer, Helmut, to Robert Bosch GmbH. Fuel injection pump for internal combustion engines. 4,873,956, Cl. 123-357.000.
Feldman, Steven: *See*—
Dola, Frank P.; Feldman, Steven; and Erwin, John K., 4,874,322, Cl. 439-210.000.
Fencil, Laura E.; Metz, Charles E.; and Doi, Kunio, to University of Chicago. Method for determination of 3-D structure in biplane angiography. 4,875,165, Cl. 364-413.220.
Feppon, Philippe: *See*—
Bezard, Jean-Jacques; Feppon, Philippe; and Rodionoff, Pierre, 4,874,242, Cl. 356-341.000.
Fergison, Hugo S., to MRE Corporation. Variable strength materials formed through rapid deformation. 4,874,644, Cl. 148-12.00R.
Fermaglich, Daniel R.; and Fermaglich, Lois F. Perch for infants and handicapped individuals. 4,873,735, Cl. 5-431.000.
Fermaglich, Lois F.: *See*—
Fermaglich, Daniel R.; and Fermaglich, Lois F., 4,873,735, Cl. 5-431.000.
Fernandez, Robert. Rotating light circuit and speaker cover. 4,875,143, Cl. 362-86.000.
Ferrari Engineering S.p.A.: *See*—
Scaglietti, Oscar, 4,874,201, Cl. 296-201.000.
Ferrari, Francesco: *See*—
Comper, Lucia; and Ferrari, Francesco, 4,874,307, Cl. 425-311.000.
Ferraris, Lori, to Konsepts Beauty Supply, Inc. Manicurist's bit. 4,874,001, Cl. 132-75.800.
Ferrero & Wepfer: *See*—
Lara, Francisco J., 4,874,092, Cl. 206-492.000.
Ferris, Donald L.: *See*—
Matuska, David G.; and Ferris, Donald L., 4,874,292, Cl. 416-140.000.
Ferriter, Kate M.; and Mathis, Robert B., to International Business Machines Corporation. Automated interfacing of design/engineering software with project management software. 4,875,162, Cl. 364-401.000.
Ferro, Gregory A., to Imi-Tech Corporation. Articles of manufacture and their production. 4,874,452, Cl. 156-308.600.
Fey, Kenneth C.; Freiberg, Alan L.; and Price, John G., to Dow Corning Corporation. Low volatility water repellents. 4,874,431, Cl. 106-2.000.
Feyen, Vincent: *See*—
Hager, Jorg; Ghyczy, Miklos; Feyen, Vincent; Imberge, Paul; Brandenburg, Ulrich; and Wilperath, Peter, 4,874,553, Cl. 260-403.000.
Fiat Auto S.p.A.: *See*—
Volonta, Piero; and Picciriello, Matteo, 4,873,763, Cl. 29-825.000.
Fiatgeotech-Tecnologie per la terra S.p.A.: *See*—
Amedei, Giuseppe; and Tornactore, Giovanni, 4,873,880, Cl. 74-336.00R.
Fien, Alan R.: *See*—
Roberts, Bryan W.; Fien, Alan R.; and Blackler, John, 4,874,291, Cl. 416-122.000.
Fiers, Walter C.; and Remaut, Rene Erik, to Biogen, Inc. Vectors and methods for making such vectors and for expressive cloned genes. 4,874,702, Cl. 435-172.000.
Fife, Wilmer K.; and Zhang, Zhi-Dong, to Indiana University Foundation. Polymer catalyzed synthesis of acid anhydrides. 4,874,558, Cl. 562-894.000.
Files, James G.: *See*—
Andrews, William H.; Brothers, Virginia M.; Files, James G.; Kuhn, Irene; McCaman, Michael T.; Paul, Leland S.; Sias, Stacey R.; Gore, Thomas C.; Newman, Karel Z., Jr.; and Tedesco, John L., 4,874,705, Cl. 435-252.330.
Filip, Mihail: *See*—
Morris, David L.; Filip, Mihail; D'Amelio, Frank D.; Esposito, Dominick G.; and Quint, Robert H., 4,874,364, Cl. 604-35.000.
Filip, Stanislaw. Roof insulating and waterproofing methods and structures. 4,873,807, Cl. 52-408.000.
Filippi, Ernest A.; and Miller, Kenneth L. Vapor monitoring system. 4,875,031, Cl. 340-605.000.
Finchimica S.p.A.: *See*—
Graziello, Donadello, 4,874,895, Cl. 564-437.000.
Findley, Marshall E.: *See*—
Liapis, Athanasios I.; Findley, Marshall E.; and Nguyen, Hoa T., 4,874,524, Cl. 210-672.000.
Fingerson, Conrad F.; Carlson, Dennis L.; Nelson, Bruce A.; and Eickhoff, Robert D., to AFC, Inc. Arrow shaft end adaptor apparatus and balance pin apparatus and method. 4,874,180, Cl. 273-416.000.
Fink, Mathias, to U.S. Philips Corporation; and Fujitsu Limited. Device for the scanning of objects by means of ultrasound echography. 4,873,869, Cl. 73-626.000.
Finnieston, Alan; Burkhalter, William E.; Reyes, Franklin; and Latta, Loren L., to Maramed Precision Corporation. Adjustable hand splint. 4,873,968, Cl. 128-87.00R.
Fiore, Leonardo; Motroni, Giuseppe; and Maritano, Mauro, to Montedison S.p.A. Liquid crystal copolyethers from 7-oxa-bicyclo-(2,2,1)-heptane. 4,874,838, Cl. 528-408.000.
Firestone Tire & Rubber Company, The: *See*—
Kipling, Kent K., 4,874,443, Cl. 156-64.000.
Fischer, Daniel E. Lottery dice. 4,874,175, Cl. 273-146.000.
Fischer, Martin: *See*—
Wambach, Ludwig; and Fischer, Martin, 4,874,865, Cl. 546-243.000.
Fischer, Rolf; Merger, Franz; and Gosch, Hans-Juergen, to BASF Aktiengesellschaft. Isomerization of 2-pentenoates to 3-pentenoates. 4,874,889, Cl. 560-205.000.
Fischer, Wolfgang; and Krenn, Karl D., to Merck Patent Gesellschaft mit Beschrankter Haftung. Solvent and method for the Karl-Fischer determination of water. 4,874,709, Cl. 436-42.000.
Flabbi, Luciano: *See*—
Johns, Ken W. E.; Briggs, Stuart; and Flabbi, Luciano, 4,874,124, Cl. 228-180.100.
Flahavan, Edward: *See*—
Conroy, Francis; Flahavan, John; and Flahavan, Edward, 4,874,624, Cl. 426-457.000.
Flahavan, John: *See*—
Conroy, Francis; Flahavan, John; and Flahavan, Edward, 4,874,624, Cl. 426-457.000.
Flanagan, Richard J., to Merck & Co., Inc. Radiolabelling kit. 4,874,601, Cl. 424-1.100.
Fleer, Ernst O.; Landgraf, Hermann; and Schwarz, Werner, to Siemens Aktiengesellschaft. Socket to clampingly hold dental tools. 4,874,314, Cl. 433-129.000.
Fleischmann, Gerald: *See*—
Eck, Herbert; Fleischmann, Gerald; Prasse, Alfred; and Kolbig, Kunigunde, 4,874,638, Cl. 427-222.000.
Fleming, Michael P.; Schloemer, George C.; and Khatri, Hiralal N., to Syntex (U.S.A.) Inc. Process for preparing (+)-2,3-Dihydro-1H-pyrrolo[1,2-a]pyrrole-1-carboxylic acid and related compounds. 4,874,871, Cl. 548-543.000.
Fleming, Michael P.; Khatri, Hiralal N.; and Schloemer, George C., to Syntex (U.S.A.) Inc. Process for preparing (+)-2,3-dihydro-1H-pyrrolo[1,2-A]pyrrole-1,7-dicarboxylates. 4,874,872, Cl. 548-531.000.
Fletcher, Daniel S.: *See*—
Ashe, Bonnie M.; and Fletcher, Daniel S., 4,874,755, Cl. 514-179.000.
Fletcher, Thomas D., to North American Philips Corporation, Signetics Division. Edge-sensitive dynamic switch. 4,874,971, Cl. 307-605.000.
Flexicon Systems Limited: *See*—
Spencer, Arthur T., 4,874,318, Cl. 439-71.000.
Flink, Attila J. Damp-proof composite flooring. 4,873,799, Cl. 52-169.800.
Fliri, Anton F. J.: *See*—
Schnur, Rodney C.; and Fliri, Anton F. J., 4,874,864, Cl. 546-153.000.
Flork, Michel, to Laboratoires Flork S.A. Zone Industrielle Du Brezet. Industrial process for the preparation of amino acids by hydrolysis of proteins in acid medium. 4,874,893, Cl. 562-443.000.
Foell, Helmut; and Lehmann, Volker, to Siemens Aktiengesellschaft. Etching method for generating apertured openings or trenches in layers or substrates composed of n-doped silicon. 4,874,484, Cl. 204-129.300.
Food and Cereal Research Limited: *See*—
Conroy, Francis; Flahavan, John; and Flahavan, Edward, 4,874,624, Cl. 426-457.000.
Ford Aerospace Corporation: *See*—
Bredthauer, Richard A., 4,875,082, Cl. 357-15.000.
Roberts, Thomas E., 4,875,024, Cl. 333-127.000.
Ford Motor Company: *See*—
Gaston, Robert D., 4,873,865, Cl. 73-317.000.
Ford New Holland, Inc.: *See*—
Snauwaert, Paul E. M.; Vergote, Geert R. J.; and Witdoek, Daniel C., 4,874,411, Cl. 55-290.000.
Foreman, Gerald L.: *See*—
Korsunsky, Iosif; Foreman, Gerald L.; and Bateman, Steven P., 4,873,761, Cl. 29-741.000.
Foreman, Michael R.; Hadermann, Albert F.; and Trippe, Jerry C., to General Technology Applications, Inc. Method for treating dispersions of oleophilic liquids and water. 4,874,528, Cl. 210-705.000.

Forker, James M.: *See—*
Gisoni, Gregory A.; and Forker, James M., 4,875,043, Cl. 341-22.000.
Forrest, William J.: *See—*
McEwen, Albert R.; and Forrest, William J., 4,874,091, Cl. 206-443.000.
Foshee, William R., to Best Lock Corporation. Escutcheon assembly. 4,873,853, Cl. 70-452.000.
Foslien, Floyd L.: *See—*
Froelich, Harold E.; and Foslien, Floyd L., 4,874,122, Cl. 227-19.000.
Foster, William H. Electrical tap switch. 4,875,152, Cl. 363-146.000.
Foust, Donald F.: *See—*
Karas, Bradley R.; Foust, Donald F.; and Dumas, William V., 4,874,635, Cl. 427-96.000.
Fowler, Joanna S.: *See—*
McPherson, Daniel W.; Fowler, Joanna S.; and Wolf, Alfred P., 4,874,600, Cl. 424-1.100.
Foxboro Company, The: *See—*
Williams, K. Barry A., 4,873,757, Cl. 29-602.100.
Franco, Nicholas N. Bug whacker light. 4,873,786, Cl. 43-112.000.
Franco, Robert S.: *See—*
Goodrich, Raymond P., Jr.; Williams, Christine M.; Franco, Robert S.; and Weiner, Murray, 4,874,690, Cl. 435-2.000.
Frank, Reiner: *See—*
Kussel, Willy; and Frank, Reiner, 4,874,335, Cl. 439-589.000.
Franks, Darrell. Use of protriptyline for the treatment of mental health problems in children. 4,874,793, Cl. 514-656.000.
Fratzer, Uwe. Use of vitamin E for normalization of blood coagulation during therapy with high unsaturated fatty acids of omega-3 type. 4,874,603, Cl. 424-10.000.
Freal-Saison, Jean-Michel, to Henkel France S.A. Apparatus for regulating the concentration of an oxidizing solution by measuring the redox potential thereof. 4,874,498, Cl. 204-400.000.
Frederick, Warren P.; Steele, Sarah L.; Rhodes, David D.; and Arns, Christopher L., to Baxter International Inc. Feeding tube facilitating improved placement and permitting subsequent delivery of a second prescribed product and method therefor. 4,874,365, Cl. 604-54.000.
Fredlund, John R.: *See—*
Bridges, Mark E.; Easterly, Robert W.; and Fredlund, John R., 4,875,103, Cl. 358-214.000.
Freed, Herbert D.; and Leach, Dennis. Flexible light rail. 4,874,320, Cl. 439-115.000.
Freeman, George A.: *See—*
Beacham, Lowrie M., III; LeBlanc, Harry S.; and Freeman, George A., 4,874,751, Cl. 514-50.000.
Freiberg, Alan L.: *See—*
Fey, Kenneth C.; Freiberg, Alan L.; and Price, John G., 4,874,431, Cl. 106-2.000.
Freidank, Michael; Coym, Jurgen; and Schubert, Axel, to Auergesellschaft GmbH. Warning device to indicate the state of gases exhaustion of a gas filter retaining dangerous gases. 4,873,970, Cl. 128-202.220.
French Oil Mill Machinery Co., The: *See—*
Upchurch, Ray, 4,874,555, Cl. 260-412.400.
Frenkel, Robert L.; Derks, Christopher S.; and Armstrong, Donald L., to Adolph Coors Company. Article transferring conveying system. 4,874,079, Cl. 198-436.000.
Frenzel, Bertram; Grenzendorfer, Dietmar; Kemter, Heinz; Wunsch, Wolfgang; and Zeisberg, Peter, to VEB Kombinat Textima. Method and apparatus for the production of textile strip. 4,873,844, Cl. 66-84.00A.
Frimmel, James J., Jr.; Ouellette, Thomas; and Deglin, Richard N., to International Telesystems Corporation. Alternate memory addressing for information storage and retrieval. 4,875,157, Cl. 364-200.000.
Fritz, Alan J., to Magnetics North, Inc. Magnetic separator. 4,874,508, Cl. 209-214.000.
Fritz, Terry. Gas pump lever holding device. 4,874,151, Cl. 251-90.000.
Froelich, Harold E.; and Foslien, Floyd L., to Minnesota Mining and Manufacturing Company. Bent back box staple and staple closing mechanism with split actuator. 4,874,122, Cl. 227-19.000.
Frommelt Industries, Inc.: *See—*
Frommelt, John A.; and Lenz, Kenneth, 4,873,800, Cl. 52-173.0DS.
Frommelt, John A.; and Lenz, Kenneth, to Frommelt Industries, Inc. Loading dock seal. 4,873,800, Cl. 52-173.0DS.
Fry, John J.; Robertson, John W., Jr.; and Bastijanic, Edward, to Babcock & Wilcox Company, The. Current fault detection system and method for AC controller. 4,875,000, Cl. 318-798.000.
FSI International, Inc.: *See—*
Grant, Robert W.; and Jenson, William M., 4,874,014, Cl. 137-606.000.
Fuchigami, Mitsuru: *See—*
Hiraishi, Shigetoshi; Koike, Naomasa; Kondo, Kazuyoshi; and Fuchigami, Mitsuru, 4,874,740, Cl. 503-201.000.
Fuchs, Hubert: *See—*
Wiest, Peter P.; and Fuchs, Hubert, 4,874,362, Cl. 604-26.000.
Fuji Electric Company Ltd.: *See—*
Moteki, Eiji, 4,875,114, Cl. 360-77.080.
Ohsawa, Masahiro; and Yonezawa, Eiichi, 4,874,976, Cl. 310-268.000.
Fuji Jukogyo Kabushiki Kaisha: *See—*
Abe, Kunihiro, 4,873,958, Cl. 123-424.000.
Furuyama, Masaaki, 4,873,950, Cl. 123-179.00B.
Fuji Kiko Company, Limited: *See—*
Matsuoka, Ken; and Yamazaki, Masanobu, 4,874,353, Cl. 474-168.000.
Fuji Photo Film Co., Ltd.: *See—*
Itabashi, Masamichi, 4,874,687, Cl. 430-446.000.
Kanzaki, Hisao; and Ohba, Hisao, 4,875,067, Cl. 354-325.000.
Kimura, Akinori; and Yoda, Akira, 4,875,080, Cl. 355-246.000.
Komatsu, Kazunori; Chikamasa, Hiroshi; and Sato, Tsunehiko, 4,874,633, Cl. 427-48.000.
Matsuda, Tsukasa; Ui, Kazuo; and Maeda, Hiroshi, 4,874,089, Cl. 206-397.000.
Okita, Tsutomu; Nakahara, Hiromi; and Ogawa, Hiroshi, 4,874,636, Cl. 427-130.000.
Ozawa, Takashi; and Kobayashi, Hidetoshi, 4,874,688, Cl. 430-546.000.
Shiota, Kazuo, 4,875,071, Cl. 355-20.000.
Urabe, Yoshihiko; Higashi, Tatsuji; Takahashi, Hiroshi; and Kita, Nobuyuki, 4,874,686, Cl. 430-272.000.
Yamamoto, Soichiro, 4,874,684, Cl. 430-138.000.
Yamanouchi, Junichi; Ono, Shigetoshi; Hirano, Tsumoru; Watanabe, Toshiyuki; Sakai, Nobuo; and Mihayashi, Keiji, 4,874,689, Cl. 430-548.000.
Fuji Xerox Co., Ltd.: *See—*
Masuda, Koji; Suemitsu, Yuji; and Asano, Kazuo, 4,875,060, Cl. 346-155.000.
Fujii, Takanori: *See—*
Tsujino, Yoshikazu; Hamada, Yuuji; Sakata, Masakazu; Fujii, Takanori; and Kuwano, Yukinori, 4,874,646, Cl. 428-34.100.
Fujii, Takayoshi: *See—*
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,874,750, Cl. 514-42.000.
Fujiki, Hiroyuki; Michiura, Yoshiharu; and Inoue, Kiyoshi, to Nissan Motor Co., Ltd.; and Ichikoh Industries Limited. Plastic structural member. 4,874,645, Cl. 428-31.000.
Fujimi Tile Co., Ltd.: *See—*
Hashimoto, Ryusuke; and Iwata, Mitsuru, 4,874,153, Cl. 264-63.000.
Fujioka, Hideaki; and Takata, Koji, to Sumitomo Electric Industries, Ltd. Wheel speed control system incorporating in-gear vibration detection and elimination means. 4,875,171, Cl. 364-508.000.
Fujishiro, Nobuo: *See—*
Hasumoto, Toshiharu; Kashiwada, Kunio; Konishi, Minoru; and Fujishiro, Nobuo, 4,874,403, Cl. 55-55.000.
Fujitsu Limited: *See—*
Fink, Mathias, 4,873,869, Cl. 73-626.000.
Miyauchi, Akira; Nishimoto, Hiroshi; Okiyama, Tadashi; Kitasagami, Hiroo; Sugimoto, Masahiro; Tamada, Haruo; and Emori, Shinji, 4,875,087, Cl. 357-71.000.
Ueno, Katsunobu; and Hataishi, Osamu, 4,875,085, Cl. 357-34.000.
Fujiwara, Keisuke: *See—*
Leonard, Vurnen; Kato, Arthur K.; Ohmori, Kiyoshi; Fujiwara, Keisuke; and Soda, Yutaka, 4,875,128, Cl. 360-133.000.
Fujiwara, Kenichi: *See—*
Wakabayashi, Makoto; Fujiwara, Kenichi; and Hayashi, Hideo, 4,874,836, Cl. 528-185.000.
Fujiyoshi, Yoshihiro; Aoki, Takatoshi; and Urata, Yasuhiro, to Honda Giken Kogyo Kabushiki Kaisha. Method of and apparatus for controlling valve operation in an internal combustion engine. 4,873,949, Cl. 123-90.120.
Fukami, Tadashi: *See—*
Odaka, Kentaro; Fukami, Tadashi; and Ozaki, Shinya, 4,875,111, Cl. 360-64.000.
Fukasawa, Yoshihito: *See—*
Kato, Toshihiro; Shindo, Masamichi; and Fukasawa, Yoshihito, 4,874,956, Cl. 250-560.000.
Fukui, Masahiro, to Matsushita Electric Industrial Co., Ltd. Building block LSI. 4,875,139, Cl. 361-410.000.
Fukumoto, Takashi: *See—*
Igarashi, Takao; Sugawara, Satoshi; Yoshimoto, Yuichiro; Saito, Shozo; Fukumoto, Takashi; Endo, Zenichiro; and Shinbo, Katsutoshi, 4,874,574, Cl. 376-333.000.
Fukunaka, Toshiaki: *See—*
Oshita, Masahide; Isai, Masaaki; and Fukunaka, Toshiaki, 4,874,438, Cl. 148-400.000.
Fukuoka, Takashi: *See—*
Masuda, Isao; Fukuoka, Takashi; and Kobayashi, Fujio, 4,873,946, Cl. 123-65.0PD.
Fukuta, Kenji; Kaneko, Takaoki; and Takahashi, Yoshinobu, to Toyota Jidosha Kabushiki Kaisha. Apparatus and method for plasma treatment of resin material. 4,874,453, Cl. 156-345.000.
Funaki, Masaaki; Kunihiro, Koki; and Ichinomiya, Yutaka, to Nippon Sheet Glass Co., Ltd. Vehicle window glass. 4,874,654, Cl. 428-192.000.
Furman, Phillip A.: *See—*
Rideout, Janet L.; Barry, David W.; Lehrman, Sandra N.; St. Clair, Martha H.; and Furman, Phillip A., 4,874,609, Cl. 424-85.400.
Furno, Franco; and Biondi, Luigi, to Ing. C. Olivetti & C., S.p.A. Arrangement for the display of processing data by means of pixels on a cathode ray tube. 4,875,035, Cl. 340-731.000.
Furuhashi, Koshi; Miyazaki, Satoshi; Furuya, Masakazu; Kawatobi, Tatsuo; Kouyama, Sinichi; and Kashio, Jiro, to Hitachi, Ltd. Transmission method for control information in communication network. 4,875,208, Cl. 370-94.100.
Furukawa, Mitsuhiko; Kitahira, Takashi; Tanaka, Sakae; and Misumi, Kiyohito, to Nippon Tungsten Co., Ltd. High-density sintered article of silicon carbid. 4,874,725, Cl. 501-89.000.

Furuya, Masakazu: *See*—
Furuhashi, Koshi; Miyazaki, Satoshi; Furuya, Masakazu; Kawatobi, Tatsuo; Kouyama, Sinichi; and Kashio, Jiro, 4,875,208, Cl. 370-94.100.
Furuyama, Masaaki, to Fuji Jukogyo Kabushiki Kaisha. Engine start control apparatus. 4,873,950, Cl. 123-179.00B.
Gabran, Clas, to Oy Stille Ab. Cannula. 4,874,379, Cl. 604-168.000.
Gage, George J. Parlor lottery game. 4,874,178, Cl. 273-274.000.
Gakei Electric Works Co., Ltd.: *See*—
Nishizawa, Minoru, 4,874,458, Cl. 156-607.000.
Gall, Ray A., to Dana Corporation. Seal and dust guard assembly for a universal joint trunnion. 4,874,349, Cl. 464-14.000.
Gallenkamp, Bernd; Gunther, Andreas; Mohrmann, Karl-Heinrich; and Schmidt, Thomas, to Bayer Aktiengesellschaft. Process for preparing 1,3,5-triazinetriones. 4,874,860, Cl. 544-221.000.
Galloway, Robert L., Jr.: *See*—
Harris, Thomas R.; and Galloway, Robert L., Jr., 4,874,949, Cl. 250-343.000.
Galloway, Terry R., to Thermolytic Decomposer. Hazardous waste reactor system. 4,874,587, Cl. 422-189.000.
Gallup, Darrell L.: *See*—
Featherstone, John L.; Spang, S. Timothy; Newell, David G.; and Gallup, Darrell L., 4,874,529, Cl. 210-713.000.
Galvanetto, Francois: *See*—
Spiess, Hansruedi; and Galvanetto, Francois, 4,873,795, Cl. 52-20.000.
Gamberini, Enzo, to V.B. Di Gamberini Enzo. Self-service, computer-operated, mechanical-electronic equipment for parking vehicles closely in side by side rows. 4,874,280, Cl. 414-234.000.
Gandy, Samuel E.; and Greengard, Paul, to Rockefeller University, The. Use of phosphoprotein patterns for diagnosis of neurological and psychiatric disorders. 4,874,694, Cl. 435-15.000.
Garavaglia, Carlo: *See*—
Menconi, Augusto; Camaggi, Giovanni; Gozzo, Franco; Mirenna, Luigi; and Garavaglia, Carlo, 4,874,786, Cl. 514-528.000.
Gardette, Jean-Luc: *See*—
Arnaud, Rene; Gardette, Jean-Luc; and Lamaire, Jacques, 4,874,952, Cl. 250-455.100.
Gardner, Geno P. Adjustable spacer device. 4,874,189, Cl. 285-39.000.
Garg, Diwaker; Klucher, Beth A.; Dyer, Paul N.; Kidd, Richard W.; and Ceccarelli, Christopher, to Air Products and Chemicals, Inc. Method for depositing a hard, fine-grained, non-columnar alloy of tungsten and carbon on a substrate. 4,874,642, Cl. 427-249.000.
Garg, Kailash C.: *See*—
Walter, Jeffrey A.; Garg, Kailash C.; and Rowan, Joseph C., 4,875,026, Cl. 333-251.000.
Garnier, Gilles: *See*—
Delpech, Guy; and Garnier, Gilles, 4,875,140, Cl. 361-412.000.
Garrity, Donald F., Jr.: *See*—
English, George J.; Rothwell, Harold L., Jr.; and Garrity, Donald F., Jr., 4,874,988, Cl. 313-620.000.
Garthwaite, Steven C., to Brunswick Corporation. Connecting rod with polymeric coated sideface. 4,873,951, Cl. 123-196.00W.
Gartland, Robert J.: *See*—
Boon, Wyndham; Gartland, Robert J.; and Pesata, Patrick J., Jr., 4,874,670, Cl. 428-423.900.
Garver, Robert V.: *See*—
Berry, Mark D.; Tan, Robert J.; and Garver, Robert V., 4,875,022, Cl. 333-20.000.
Garwin, Jeffrey L.: *See*—
Wallner, Barbara P.; Pepinsky, R. Blake; and Garwin, Jeffrey L., 4,874,743, Cl. 514-12.000.
Gas Tank Renu - USA: *See*—
Lavoie, Patrick J., 4,874,445, Cl. 156-64.000.
Gast, Joseph R.: *See*—
Cang, John N.; Gast, Joseph R.; Hensley, John J.; and Waldhelm, Christian M., 4,874,290, Cl. 415-173.400.
Gaston, Robert D., to Ford Motor Company. Fuel sender assembly requiring no calibration. 4,873,865, Cl. 73-317.000.
Gay, Richard L.; and McKenzie, Donald E., to Rockwell International Corporation. Magnesium fluoride recovery method. 4,874,599, Cl. 423-490.000.
Gayer, Herbert: *See*—
Jelich, Klaus; Gayer, Herbert; Kramer, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,874,424, Cl. 71-105.000.
Gaynor, Dennis A.; and Hansen, James R., to Viskase Corporation. Spice-odor antimycotic containing cellulosic casing article. 4,874,622, Cl. 426-135.000.
Gearhart, Kenton, to American Maplan Corporation. Siding die. 4,874,306, Cl. 425-192.00R.
Gehrt, Heinz H.; Hildebrandt, Gunter; and Rehfeldt, Karl-Heinz, to U.S. Philips Corporation. Multivibrator circuit having compensated delay time. 4,874,966, Cl. 307-291.000.
Geisinger, William R.: *See*—
Bruhl, J. D.; and Geisinger, William R., 4,873,863, Cl. 73-49.200.
Geiver, S.A.: *See*—
Martorell, D. Aurelio T., 4,873,820, Cl. 56-340.100.
Gelatt, Sharon G. Blow dryer holder. 4,874,142, Cl. 248-185.000.
Gelman, Gideon. Reading assistance device for word processor. 4,875,179, Cl. 364-708.000.
General Dynamics Land Systems, Inc.: *See*—
Suchocki, Anthony J., 4,873,911, Cl. 89-34.000.
General Electric Company: *See*—
Allen, Richard B.; Gibbs, William E.; and Hans, Lynn M., 4,874,796, Cl. 521-59.000.
Berdahl, Donald R., 4,874,835, Cl. 528-179.000.
Karas, Bradley R.; Foust, Donald F.; and Dumas, William V., 4,874,635, Cl. 427-96.000.
Lee, Gim F., Jr.; Heuschen, Jean M.; and Van Der Meer, Roelof, 4,874,810, Cl. 524-505.000.
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,874,783, Cl. 524-482.000.
Prabhu, Ashok N.; Hang, Kenneth W.; and Conlon, Edward J., 4,874,550, Cl. 252-512.000.
Thompson, Robert A., 4,873,855, Cl. 72-53.000.
General Foods Corp.: *See*—
Boyle, Peter C.; Steffen, Daniel G.; Melton, John L.; Coccodrilli, Gus D., Jr.; and Nagy, Michael A., 4,874,606, Cl. 426-74.000.
General Foods Limited: *See*—
Newman, Alec T.; Bentley, Andrew C.; King, Christine A.; MacMahon, Alistair J.; Tansley, Robert W.; and Gibbs, Andrew R., 4,873,915, Cl. 99-289.00R.
General Mills, Inc.: *See*—
Seaborne, Jonathan; and Egbert, David C., 4,874,618, Cl. 426-76.000.
General Motors Corporation: *See*—
Bensing, Gregory L.; Gladd, Joseph H.; and Yurtin, John A., 4,874,325, Cl. 439-272.000.
Chandley, George D., 4,874,029, Cl. 164-34.000.
Lederman, Frederick E., 4,874,069, Cl. 192-45.000.
White, Charles R., 4,874,071, Cl. 192-58.00B.
General Scanning, Inc.: *See*—
Montagu, Jean I., 4,874,215, Cl. 350-6.600.
General Signal Corporation: *See*—
Engle, Thomas H., 4,874,065, Cl. 188-265.000.
General Technology Applications, Inc.: *See*—
Foreman, Michael R.; Hadermann, Albert F.; and Trippe, Jerry C., 4,874,528, Cl. 210-705.000.
Gensheimer, Valentin: *See*—
Simeth, Claus; and Gensheimer, Valentin, 4,873,926, Cl. 101-409.000.
Gentili, Fred: *See*—
Walsh, David J.; Lougheed, William M.; Gentili, Fred; and Fazl, Mahmood, 4,873,975, Cl. 128-334.00R.
George, Eric R.; Danforth, Richard L.; and Byrd, Paul S., to Shell Oil Company. Polymer blend. 4,874,801, Cl. 523-214.000.
George, Eric R.; Lutz, Robert G.; and Smutny, Edgar J., to Shell Oil Company. Polymer blend. 4,874,819, Cl. 525-185.000.
Georgia Tech Research Corporation: *See*—
Hughes, David W.; Feeney, Robert K.; and Hertling, David R., 4,874,711, Cl. 437-8.000.
Gerbig, Barry V., Jr. Portable auxiliary automobile heater. 4,874,921, Cl. 219-202.000.
Gergen, William P., to Shell Oil Company. Polymer blend of carbon monoxide olefin copolymer and polyether esteramide polymer. 4,874,825, Cl. 525-425.000.
Gethke, Hans-Gerd; Eitner, Detlef; and Engelhard, Friedel. Gas supply and distribution center. 4,874,133, Cl. 239-555.000.
Gewerkschaft Eisenhutte Westfalia GmbH: *See*—
Kussel, Willy; and Frank, Reiner, 4,874,335, Cl. 439-589.000.
Ghosh Roy, Dilip N.: *See*—
Brimhall, Owen D.; Peterson, Stephen C.; Kotlyar, Oleg; and Ghosh Roy, Dilip N., 4,874,358, Cl. 494-37.000.
Ghyczy, Miklos: *See*—
Hager, Jorg; Ghyczy, Miklos; Feyen, Vincent; Imberge, Paul; Brandenburg, Ulrich; and Wilperath, Peter, 4,874,553, Cl. 260-403.000.
Giancarlo, Cristiani, to Danieli & C. Officine Meccaniche SpA. Device to draw extruded stock for an extrusion press. 4,873,857, Cl. 72-257.000.
Gibbs, Andrew R.: *See*—
Newman, Alec T.; Bentley, Andrew C.; King, Christine A.; MacMahon, Alistair J.; Tansley, Robert W.; and Gibbs, Andrew R., 4,873,915, Cl. 99-289.00R.
Gibbs, William E.: *See*—
Allen, Richard B.; Gibbs, William E.; and Hans, Lynn M., 4,874,796, Cl. 521-59.000.
Gilead, Gideon. Drip irrigation apparatus. 4,874,132, Cl. 239-542.000.
Gill, Jasbir S., to Calgon Corporation. Method for controlling silica/-silicate deposition in aqueous systems using imines. 4,874,527, Cl. 210-700.000.
Gilliusson, Rolf, to SwedSteam AB. Energy co-generation system. 4,873,840, Cl. 62-238.600.
Gilman, Byron L.: *See*—
Comben, Richard H.; Gilman, Byron L.; and Shturman, Leonid, 4,874,371, Cl. 604-95.000.
Gilson, Richard W.: *See*—
Moran, John P.; Gilson, Richard W.; and Heubel, Thomas W., 4,874,385, Cl. 604-208.000.
Ginns, Haskell, to Indikon Company, Inc., The. Eddy current proximity system. 4,875,007, Cl. 324-207.000.
Ginsburg, Robert. Device and method for emboli retrieval. 4,873,978, Cl. 128-345.000.
Ginter, David J., to Armstrong Rubber Co., The. Apparatus for forming endless tire reinforcing belts. 4,874,455, Cl. 156-397.000.
Gioia, Samuel C., to NCR Corporation. Method of making asymmetrically optimized CMOS field effect transistors. 4,874,713, Cl. 437-34.000.
Giorgio, Bacialli: *See*—
Leonardo, Covi; Giorgio, Bacialli; and Raffaele, Degli E., 4,874,619, Cl. 426-94.000.

Girardin, Ronald E. Horse racing game. 4,874,177, Cl. 273-246.000.

Gisoni, Gregory A.; and Forker, James M., to Westinghouse Electric Corp. Bi-directional keyboard interface circuit. 4,875,043, Cl. 341-22.000.

Gitman, Gregory M., to American Combustion, Inc. Method and apparatus for improved regenerative furnace. 4,874,311, Cl. 432-13.000.

Gitter, Michael. Footrest having heating, vibration and massaging adjusted by user's feet. 4,873,966, Cl. 128-33.000.

Gladd, Joseph H.: *See*—
Bensing, Gregory L.; Gladd, Joseph H.; and Yurtin, John A., 4,874,325, Cl. 439-272.000.

Glaeser, Linda C.: *See*—
Brazdil, James F., Jr.; Glaeser, Linda C.; and Toft, Mark A., 4,874,738, Cl. 502-209.000.

Gleasman, Vernon E. Tool for removing snap rings. 4,873,754, Cl. 29-229.000.

Gleason, John G.; Hall, Ralph F.; Ku, Thomas W.; and Perchonock, Carl D., to Smithkline Beckman Corporation. Thiophenyl Alkanoic acids useful as leukotriene antagonists. 4,874,792, Cl. 514-570.000.

Glenn, Michael I.: *See*—
Archer, Timothy H. V.; Bowman, Randy; and Glenn, Michael I., 4,875,054, Cl. 346-1.100.

Glockner, Charles A.: *See*—
Sorensen, James L.; Yarbro, Mark D.; and Glockner, Charles A., 4,874,534, Cl. 210-803.000.

Glory Kogyo Kabushiki Kaisha: *See*—
Kanayama, Yutaka, 4,875,172, Cl. 364-513.000.

Godlew, David P.: *See*—
Damon, Gerald D.; and Godlew, David P., 4,874,074, Cl. 192-106.200.

Goff, Frederick: *See*—
Kee, Howard; and Goff, Frederick, 4,874,049, Cl. 177-59.000.

Goffe, William L.; and Schram, Joseph G., to Xerox Corporation. Electrophotographic device having a.c. biased cleaning member. 4,875,081, Cl. 355-303.000.

Gold, Raymond; and Roberts, James H. Solid-state track recorder dosimetry device to measure absolute reaction rates and neutron fluence as a function of time. 4,874,951, Cl. 250-472.100.

Gold Star Co., Ltd.: *See*—
Kang, Sung S., 4,875,123, Cl. 360-109.000.

Goldberg, Jay R.; and Hillegass, Donald V., to Medical Engineering Corporation. Ureteral stent system. 4,874,360, Cl. 604-8.000.

Golden, Michael D. Electrical outlet positioner. 4,874,334, Cl. 439-538.000.

Goldman, Geri I. Strainer pot with whistling spout. 4,873,918, Cl. 99-403.000.

Goldstein, Harvey R.; and Haddad, Edward N., Jr., to Pioneer Consolidated Corp. Truck cover having an improved telescopic arm assembly. 4,874,196, Cl. 296-98.000.

Goldzweig, Abe. Hand or foot manipulated self clamping device. 4,874,156, Cl. 269-158.000.

Gomi, Fukuo: *See*—
Ito, Tomohito; Isomura, Renichi; Hirai, Hidetoshi; and Gomi, Fukuo, 4,874,495, Cl. 204-212.000.

Gonner, Winfried, to Perkin-Elmer Corporation, The. Apparatus for examination of heats of transformation of material samples. 4,874,250, Cl. 374-43.000.

Goodrich, Raymond P., Jr.; Williams, Christine M.; Franco, Robert S.; and Weiner, Murray, to Cryopharm Corporation. Lyophilization of red blood cells. 4,874,690, Cl. 435-2.000.

Goodson, Thomas A.; and Truelove, Ronald D. Lock protector. 4,873,849, Cl. 70-54.000.

Goodwin, Dennis L.; Hawkins, Mark R.; Johnson, Wayne L.; Olsen, Aage; and Robinson, McDonald, to Epsilon Limited Partnership. Process for epitaxial deposition of silicon. 4,874,464, Cl. 156-646.000.

Goodyear Tire & Rubber Company, The: *See*—
Boon, Wyndham; Gartland, Robert J.; and Pesata, Patrick J., Jr., 4,874,670, Cl. 428-423.900.

Gordon, Alan J.; and Billington, Donald G., to Shandon Scientific Limited. Sample handling unit for centrifugation. 4,874,582, Cl. 422-102.000.

Gordon Corporation, The: *See*—
Miceli, Daniel, 4,874,149, Cl. 248-530.000.

Gordon, Mark G.: *See*—
Newgard, Kent W.; and Gordon, Mark G., 4,874,377, Cl. 604-167.000.

Gore, Thomas C.: *See*—
Andrews, William H.; Brothers, Virginia M.; Files, James G.; Kuhn, Irene; McCaman, Michael T.; Paul, Leland S.; Sias, Stacey R.; Gore, Thomas C.; Newman, Karel Z., Jr.; and Tedesco, John L., 4,874,705, Cl. 435-252.330.

Gorlich, Lothar, to UTB Umwelttechnik Buchs AG. Method for desulfurization of sulfur or hydrogen sulfide-containing gases. 4,874,589, Cl. 423-220.000.

Gorshkov, Nikolai V.: *See*—
Petrov, Vyacheslav V.; Gorshkov, Nikolai V.; Antonov, Alexandr A.; Tokar, Alexandr P.; Krjuchin, Andrei A.; and Shanoilo, Semen M., 4,875,204, Cl. 369-100.000.

Goscenski, Edward J., Jr., to Eaton Corporation. Manual transmission and gear rattle damper therefor. 4,873,882, Cl. 74-411.000.

Gosch, Hans-Juergen: *See*—
Fischer, Rolf; Merger, Franz; and Gosch, Hans-Juergen, 4,874,889, Cl. 560-205.000.

Gotman, Alexander S., to Arant, Gene W.; Kleinberg, Marvin H.; and Lerner, Marshall A. Secure three-piece threaded fastener, and method. 4,874,275, Cl. 411-5.000.

Goto, Nobutaka: *See*—
Kobayashi, Kazuhiro; Kurematsu, Masayuki; Koboshi, Shigeharu; Goto, Nobutaka; and Takabayashi, Naoki, 4,874,530, Cl. 210-718.000.

Goto, Takao: *See*—
Yamada, Shin-ichi; Goto, Takao; Mashiko, Toshihisa; Kogi, Kentaro; Oguchi, Yukiko; and Narita, Senichi, 4,874,760, Cl. 514-234.200.

Gotou, Takeshi: *See*—
Yanagida, Kouichi; Kano, Shinichiro; Gotou, Takeshi; and Hirose, Takashi, 4,874,062, Cl. 181-250.000.

Gottlieb, A. Arthur, to Imreg, Inc. Therapeutic method for treating malignancies. 4,874,608, Cl. 424-85.100.

Gottschalk, Peter, to Mead Corporation, The. Laminating transparent or translucent materials using ionic dye-counter ion complexes. 4,874,450, Cl. 156-275.500.

Gottschlich, Chad F.: *See*—
Seemann, Howard; and Gottschlich, Chad F., 4,874,310, Cl. 431-8.000.

Gouda, Masanori: *See*—
Namiki, Masayuki; Gouda, Masanori; and Kamiya, Masaaki, 4,875,011, Cl. 324-251.000.

Goul, Ashley S. Fast clamp. 4,874,155, Cl. 269-6.000.

Gozzo, Franco: *See*—
Menconi, Augusto; Camaggi, Giovanni; Gozzo, Franco; Mirenna, Luigi; and Garavaglia, Carlo, 4,874,786, Cl. 514-528.000.

Grable, Robert G. Retractable porch for mobile homes. 4,874,197, Cl. 296-162.000.

Grade, Reinhardt; and Thomas, Brien M., to Ciba-Geigy Corporation. Treatment of water. 4,874,526, Cl. 210-697.000.

Grady, John: *See*—
Rossi, Remo J.; and Grady, John, 4,875,227, Cl. 378-154.000.

Graf, Hans P.; and Howard, Richard E., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Neural networks. 4,875,183, Cl. 364-807.000.

Graham, Samuel L.; and Scholz, Thomas H., to Merck & Co., Inc. Intermediates for preparing HMG-CoA reductase inhibitors. 4,874,870, Cl. 548-336.000.

Grant, Charles B., to Dow Chemical Company, The. Novel fluorinated bis(salicylates). 4,874,886, Cl. 560-70.000.

Grant, Robert W.; and Jenson, William M., to FSI International, Inc. Flow control manifold. 4,874,014, Cl. 137-606.000.

Granzotto, Robert: *See*—
Armstrong, Richard J.; and Granzotto, Robert, 4,874,143, Cl. 242-198.000.

Grass Valley Group, Inc., The: *See*—
Jackson, Richard A., 4,875,097, Cl. 358-180.000.

Gravisse, Philippe; Duchateau, Jacques; and Perron, Maurice, to B.R.I.C.-Bureau de Recherche pour l' Innovation et la Convergence & Banque de France. Fiduciary or security object enabling visual or optical authentification. 4,874,188, Cl. 283-89.000.

Graziello, Donadello, to Finchimica S.p.A. Process for purifying crude trifluralin. 4,874,895, Cl. 564-437.000.

Green, Lloyd C., to Heat-Fab, Inc. Flue gas conduit connector. 4,874,191, Cl. 285-332.300.

Greene, Richard A.: *See*—
Elliott, William A.; Greene, Richard A.; Kennedy, Robert P.; Poe, Robert P., Jr.; and Steece, William H., 4,873,762, Cl. 29-809.000.

Greengard, Paul: *See*—
Gandy, Samuel E.; and Greengard, Paul, 4,874,694, Cl. 435-15.000.

Greenwald, Richard B.; Liu, Chung-Tsing; and McDonell, James A., to Ecolab Inc. Graft copolymers of a polyether moiety on a polycarboxylate backbone. 4,874,540, Cl. 252-174.240.

Greenwell, Joseph D., to Jones, R. A. & Co. Inc. Automatic changeover for cartoners. 4,874,067, Cl. 192-4.00R.

Greeves, Godfrey; Potter, James C.; Andrews, Richard J.; and Harris, Kenneth M., to Lucas Industries Public Limited Company. Fuel pumping apparatus. 4,874,301, Cl. 417-462.000.

Grehier, Alain: *See*—
Rojey, Alexandre; and Grehier, Alain, 4,873,835, Cl. 62-93.000.

Greig, Donald G.; and Bonneau, Edward L., III, to Nouevelle Ice Cream Corporation. Non-fat dairy compositions. 4,874,627, Cl. 426-565.000.

Grenzendorfer, Dietmar: *See*—
Frenzel, Bertram; Grenzendorfer, Dietmar; Kemter, Heinz; Wunsch, Wolfgang; and Zeisberg, Peter, 4,873,844, Cl. 66-84.00A.

Grieb, Hubert, to MTU Motoren-und Turbinen-Union Munchen GmbH. Variable-geometry turbocompressor. 4,874,287, Cl. 415-149.200.

Grigo, Ulrich: *See*—
Dujardin, Ralf; Ebert, Wolfgang; Meyer, Rolf-Volker; Berg, Klaus; Grigo, Ulrich; and Wehnert, Wolfgang, 4,874,816, Cl. 525-146.000.

Grimm, Frank W., to Zenith Electronics Corporation. Component mounting process for printed circuit boards. 4,873,764, Cl. 29-830.000.

Griswold, William A., Jr.: *See*—
Roberts, Joseph E.; and Griswold, William A., Jr., 4,874,152, Cl. 254-264.000.

Grobecker, Hermann; Heher, Werner; Zielasek, Adelbert; and Nusselder, Frederik B., to Polygram GmbH. Storage cassette for high

storage density, disc-shaped information carriers. 4,874,085, Cl. 206-309.000.

Grof, Franz: *See*—
Chakraborty, Asok; Urlaub, Herbert; Grof, Franz; and Cosack, Klaus, 4,874,513, Cl. 210-321.840.

Groo, Dora: *See*—
Lapis, Erzsebet; Toth, Edit; Kiss, Bela; Torley, Jozsef; Palosi, Eva; Hajdu, Istvan; Szporny, Laszlo ; Groo, Dora; and Laszlovszky, Istvan, 4,874,765, Cl. 514-255.000.

Groshens, Pierre, to Lainiere de Picardie. Fusible textile product and method of manufacture. 4,874,655, Cl. 428-198.000.

Grosschadl, Werner: *See*—
Klammer, Josef; and Grosschadl, Werner, 4,874,104, Cl. 220-4.00B.

Groswith III, Charles T.; Seipp III, Edwin A.; Sun, Rickson; and Yurchenco, James R., to Taurus Holdings, Inc. Paper sheets binding system. 4,874,186, Cl. 281-28.000.

Grube, Gerhard: *See*—
Kaplan, Horst; and Grube, Gerhard, 4,874,076, Cl. 198-370.000.

Gruenhoff, Ulrich; and Schneider, Bernhard, to Kohlensaeurewerk Deutschland GmbH. Process for preparing wine. 4,874,615, Cl. 426-15.000.

Grumman Aerospace Corporation: *See*—
Maoz, Barak, 4,875,023, Cl. 333-81.00R.

GTE Laboratories Incorporated: *See*—
Sigai, A. Gary; Lapatovich, Walter P.; and Alexander, Michael N., 4,874,984, Cl. 313-486.000.

GTE Mobilnet Incorporated: *See*—
Blair, Kevin B., 4,875,230, Cl. 379-63.000.

GTE Products Corporation: *See*—
English, George J.; Rothwell, Harold L., Jr.; and Garrity, Donald F., Jr., 4,874,988, Cl. 313-620.000.

GTE Valeron Corporation: *See*—
Van Sickle, Richard G.; and Bour, George, 4,873,768, Cl. 33-178.00R.

Guanciale, Gary. Apparatus for improving efficiency and consistency of a drag race car. 4,873,891, Cl. 74-625.000.

Gudermuth, Clyde S., Jr., to EBSCO Industries, Inc. Swivel tail articulated fishing lure. 4,873,782, Cl. 43-42.150.

Guerendel, Philippe; Naville, Charles; Laurent, Jean; and Dedole, Pascal, to Institut Francais du Petrole & Compagnie Generale de Geophysique. Device for receiving sound waves in a well. 4,874,060, Cl. 181-102.000.

Guigan, Jean. Device for dispensing a predetermined quantity of a liquid. 4,874,114, Cl. 222-168.000.

Guinter, S. R., to Newell Co. Universal display bracket. 4,874,148, Cl. 248-225.200.

Gunther, Andreas: *See*—
Gallenkamp, Bernd; Gunther, Andreas; Mohrmann, Karl-Heinrich; and Schmidt, Thomas, 4,874,860, Cl. 544-221.000.

Gunther, Wolfgang H. H.; Leone, Ronald E.; and Przyklek, Rosemary, to Eastman Kodak Company. Photographically useful chalcogenazoles, chalcogenazolines, and chalcogenazolinium and chalcogenazolium salts. 4,874,866, Cl. 548-100.000.

Guscott, John K.; Stelmack, Gerard G.; and Boulos, Charles A., to Aritech Corporation. Suppressed transient uniform detection sensitivity pir detector. 4,875,029, Cl. 340-567.000.

Guthrie Canadian Investments Limited: *See*—
Burke, Patrick E., 4,874,916, Cl. 219-10.750.

Gutman, Robert F.; and Migrin, Robert, to United Technologies Automotive, Inc. Vehicular display view control system. 4,874,224, Cl. 350-174.000.

Gutzwiller, H. Leslie. Modified centrifugal airfoil fan wheel. 4,874,293, Cl. 416-184.000.

Guyon, Richard D.: *See*—
Cary, Richard W.; and Guyon, Richard D., 4,875,159, Cl. 364-200.000.

Haas, Peter; Sommerfeld, Claus-Dieter; and Weber, Hans-Ulrich, to Bayer Aktiengesellschaft. Oligourea polyols, polyether polyols produced from them and the use of these polyols in the isocyanate polyaddition process. 4,874,797, Cl. 521-167.000.

Haase, Peter; Kosikowski, Thomas; and Steger, Horst, to Schering Aktiengesellschaft. Method and device for feeding plate shaped objects into and from suspension frames of an installation for chemical treatment in baths, particularly in electroplating baths installation. 4,874,479, Cl. 204-27.000.

Habara, Hideaki: *See*—
Sugimori, Teruhiko; Suzuki, Fumio; Habara, Hideaki; and Inada, Hiromasa, 4,874,841, Cl. 528-491.000.

Hack, J. Roy, Jr. Emergency fuel system apparatus. 4,874,013, Cl. 137-571.000.

Hadano, Yoshikazu; Tsunoda, Eiji; and Kajigaya, Ichiro, to Electric Power Research Institute. Steam turbine plant. 4,873,827, Cl. 60-646.000.

Haddad, Edward N., Jr.: *See*—
Goldstein, Harvey R.; and Haddad, Edward N., Jr., 4,874,196, Cl. 296-98.000.

Hadermann, Albert F.: *See*—
Foreman, Michael R.; Hadermann, Albert F.; and Trippe, Jerry C., 4,874,528, Cl. 210-705.000.

Hagemeyer, Friedrich-Wilhelm, to Siemens Aktiengesellschaft. Method of apparatus for realizing a logical operation by modifying a flow of energy. 4,875,181, Cl. 364-716.000.

Hagen, Uwe; and Redler, Udo, to Siemens Aktiengesellschaft. Multipart neutral electrode for an hf surgical instrument. 4,873,973, Cl. 128-303.130.

Hagen, Uwe; and Redler, Udo, to Siemens Aktiengesellschaft. Neutral electrode for a high-frequency surgical instrument. 4,873,974, Cl. 128-303.130.

Hager, Jorg; Ghyczy, Miklos; Feyen, Vincent; Imberge, Paul; Brandenburg, Ulrich; and Wilperath, Peter, to A. Nattermann & Cie. GmbH. Aqueous phospholipid solutions containing a solubilizing agent. 4,874,553, Cl. 260-403.000.

Haghiri, Mohammad-Reza; and Boutrois, Bertrand, to U.S. Philips Corporation. Method of and device for estimating motion in a sequence of pictures. 4,875,094, Cl. 358-105.000.

Hailey, Robert W. Heating and handling system for objects. 4,874,312, Cl. 432-122.000.

Haines, Robert C., to Dunlop Limited. Method of making a games racket. 4,874,570, Cl. 264-154.000.

Hajdu, Istvan: *See*—
Lapis, Erzsebet; Toth, Edit; Kiss, Bela; Torley, Jozsef; Palosi, Eva; Hajdu, Istvan; Szporny, Laszlo ; Groo, Dora; and Laszlovszky, Istvan, 4,874,765, Cl. 514-255.000.

Hajovsky, Robert J., to Ameron, Inc. Conductive adhesive. 4,874,548, Cl. 252-511.000.

Hakamada, Ichiro: *See*—
Tahara, Tetsuya; Ikebe, Tsuguo; Hakamada, Ichiro; and Yaoka, Osamu, 4,874,759, Cl. 514-232.500.

Halbritter, Guenter: *See*—
Kiss, Akos; Kleinschmit, Peter; Hanich, Juergen; Halbritter, Guenter; and Horst, Jenny, 4,874,433, Cl. 106-450.000.

Halford, Christopher J.: *See*—
Decker, John A., Jr.; Decker, Linda M.; and Halford, Christopher J., 4,873,907, Cl. 84-291.000.

Hall, Charles E.: *See*—
Bogese, Stephen B., II; and Hall, Charles E., 4,874,330, Cl. 439-418.000.

Hall, Ralph F.: *See*—
Gleason, John G.; Hall, Ralph F.; Ku, Thomas W.; and Perchonock, Carl D., 4,874,792, Cl. 514-570.000.

Hallam, Donald E.; Popper, Peter; Staunton, Harold F.; Taylor, Robert E.; and Yngve, Paul W., to Du Pont de Nemours, E. I., and Company. Apparatus and process for forming alternate twist plied yarn. 4,873,821, Cl. 57-293.000.

Hallden-Abberton, Michael P.; Cohen, Leslie A.; and Wood, Robert S., to Rohm and Haas Company. Process for manufacturing low-acid, glutaric-anhydride-containing copolymers. 4,874,824, Cl. 525-379.000.

Halliburton Logging Services, Inc.: *See*—
Ip, Matthew, 4,874,327, Cl. 439-275.000.

Hallihan, Timothy J.: *See*—
Russell, Frank S.; and Hallihan, Timothy J., 4,873,854, Cl. 72-12.000.

Halpern, Donald F.; and Robin, Mark L., to BOC, Inc. Process for the production of polyfluorinated ethers. 4,874,901, Cl. 568-683.000.

Hamada, Takao; Tsuchiya, Nobuo; Inatani, Toshihiro; Katayama, Eiji; Koitabashi, Toshimitsu; Okabe, Kyoji; Sumito, Mitsuo; and Takada, Yoshiyasu, to Kawasaki Steel Corporation. Methods for melting and refining a powdery ore containing metal oxides. 4,874,427, Cl. 75-26.000.

Hamada, Yuuji: *See*—
Tsujino, Yoshikazu; Hamada, Yuuji; Sakata, Masakazu; Fujii, Takanori; and Kuwano, Yukinori, 4,874,646, Cl. 428-34.100.

Hamaguchi, Shigeki; Ohtsuka, Yasuhiro; Motohiro, Tomoyoshi; Taga, Yasunori; and Ishii, Masahiko, to Toyota Jidosha Kabushiki Kaisha; and Kabushiki Kaisha Toyota Chuo Kenkyusho. Birefringent plate and manufacturing method for the same. 4,874,664, Cl. 428-325.000.

Hamakawa, Tomoaki: *See*—
Ushimaru, Koichi; Hamakawa, Tomoaki; and Koga, Tomio, 4,874,774, Cl. 514-356.000.

Hamamatsu Photonics Kabushiki Kaisha: *See*—
Koishi, Musubu; Mizushima, Yoshihiko; and Kan, Hirofumi, 4,875,093, Cl. 358-83.000.

Hamasaki, Masaharu: *See*—
Yonemoto, Kazuya; Kagawa, Yoshiaki; Ishikawa, Kikue; Suzuki, Tomoyuki; and Hamasaki, Masaharu, 4,875,100, Cl. 358-213.190.

Hamasaki, Naotaka; Kawamura, Hirotaka; Ohtsu, Norio; Nakakoshi, Ichiro; Ataka, Kikuo; Oomori, Kiyosi; and Kouno, Masahiko, to Ube Industries, Ltd. Process for preparing monosodium phosphoenolpyruvate. 4,874,882, Cl. 558-131.000.

Hamilton Standard Controls, Inc.: *See*—
Bornstein, Norman S., 4,874,430, Cl. 75-234.000.

Hammerschmidt, Erich; and Blank, Heinz U., to Bayer Aktiengesellschaft. Process for the preparation of 6-hydroxynaphthalene-1-carboxylic from 1-aminomethylnaphthalene-6-sulphonic acid. 4,874,892, Cl. 562-409.000.

Hang, Kenneth W.: *See*—
Prabhu, Ashok N.; Hang, Kenneth W.; and Conlon, Edward J., 4,874,550, Cl. 252-512.000.

Hanich, Juergen: *See*—
Kiss, Akos; Kleinschmit, Peter; Hanich, Juergen; Halbritter, Guenter; and Horst, Jenny, 4,874,433, Cl. 106-450.000.

Hanna, Khalil. Micro-surgical instrument for use as gripper of scissors. 4,873,979, Cl. 128-354.000.

Hannaford, Billy H.: *See*—
Luther, Ronald B.; and Hannaford, Billy H., 4,874,373, Cl. 604-164.000.

Hans, Lynn M.: *See*—
Allen, Richard B.; Gibbs, William E.; and Hans, Lynn M., 4,874,796, Cl. 521-59.000.

Hansen, James R.: *See—*
Gaynor, Dennis A.; and Hansen, James R., 4,874,622, Cl. 426-135.000.

Hanson, Robert L., to Minnesota Mining and Manufacturing Company. Record/not record latch for recording cassette. 4,875,109, Cl. 360-60.000.

Hansson, Birger: *See—*
Hultberg, Sten; and Hansson, Birger, 4,873,925, Cl. 101-147.000.

Hantel, Ulrich: *See—*
Affeldt, Karl-Heinz; and Hantel, Ulrich, 4,873,988, Cl. 128-687.000.

Hanulik, Jozef, to RecyTec S.A. Process for the recycling of electrical batteries, assembled printed circuit boards and electronic components. 4,874,486, Cl. 204-140.000.

Hara, Toshihiro; Yotsutani, Akio; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, to NEC Corporation; Nippon Telegraph & Telephone Corp.; and Kabushiki Kaisha Toshiba. Radio telephone system. 4,875,231, Cl. 379-61.000.

Harada, Jiro, to Harada Kogyo Kabushiki Kaisha. Drive control device for an electrically-driven extending and retracting antenna. 4,875,053, Cl. 343-903.000.

Harada Kogyo Kabushiki Kaisha: *See—*
Harada, Jiro, 4,875,053, Cl. 343-903.000.

Harada, Masato: *See—*
Miya, Shinya; Harada, Masato; Mise, Takaya; and Yamazaki, Hiroshi, 4,874,880, Cl. 556-53.000.

Harada, Nozomu: *See—*
Endo, Yukio; and Harada, Nozomu, 4,875,101, Cl. 358-213.190.

Harada, Shinji: *See—*
Matsukawa, Hideki; Masuyama, Takeshi; Hirota, Minoru; Wakahata, Yasuo; Itoh, Masahiro; and Harada, Shinji, 4,874,227, Cl. 350-334.000.

Harbison, Barry B.: *See—*
Vacha, Lubos J. B.; Schultz, Peter C.; Moynihan, Cornelius T.; Raychaudhuri, Satyabrata; Cadien, Ken C.; Harbison, Barry B.; and Mossadegh, Reza, 4,874,222, Cl. 350-96.340.

Harbor Branch Oceanographic Institution, Inc.: *See—*
Munro, Murray H. G.; Perry, Nigel B.; and Blunt, John W., 4,874,767, Cl. 514-278.000.

Hardin, Bengt Y.: *See—*
Karlsson, Hakan I.; Lundqvist, Inge J.; Hardin, Bengt Y.; and Ostman, Thomas L., 4,874,467, Cl. 162-198.000.

Harfst, Michael D., to Blount, Inc. Saw chain with wear link. 4,873,903, Cl. 83-830.000.

Harlowe, William W.: *See—*
Wilson, Wilfred W.; Polemenakos, Sotiros C.; Potter, J. Larry; Mangold, Donald J.; Harlowe, William W.; and Schlameus, Herman W., 4,874,611, Cl. 424-410.000.

Harms, Frank M.; Tripp, Victor; and Wells, Thomas B., to Lifeblood Advanced Blood Bank Systems, Inc. Apparatus for the rapid microwave thawing of cryopreserved blood, blood components, and tissue. 4,874,915, Cl. 219-10.55F.

Harms, Louis C., to United Technologies Automotive, Inc. Electrically controlled pressure relief valve system and method. 4,873,817, Cl. 56-10.200.

Harms, Sherry J.: *See—*
Bowen, Terry P.; Harms, Sherry J.; and Hoffer, John C., 4,874,218, Cl. 350-96.200.

Harms, Wolfgang, to Bayer Aktiengesellschaft. Aminoalkoxytriphendioxazine dyestuffs useful for dyeing and printing hydroxyl- and amino-containing materials. 4,874,857, Cl. 544-75.000.

Harrell, Julia E.: *See—*
Sapp, William M.; and Harrell, Julia E., 4,873,736, Cl. 5-434.000.

Harris, Arthur, to Davis Meditech. Precision liquid handling apparatus. 4,873,877, Cl. 73-864.160.

Harris, Charles C. Method of making a shrink wrap package. 4,873,814, Cl. 53-442.000.

Harris, Kenneth M.: *See—*
Greeves, Godfrey; Potter, James C.; Andrews, Richard J.; and Harris, Kenneth M., 4,874,301, Cl. 417-462.000.

Harris, Thomas R.; and Galloway, Robert L., Jr., to Vanderbilt University. Method of measuring lung vascular function and transcapillary transport by the use of nonradioactive markers. 4,874,949, Cl. 250-343.000.

Harsch, Curtis L.; and Beach, Kerry B., to Harsch, Curtis L. Method and apparatus for measuring surface temperatures. 4,875,176, Cl. 364-557.000.

Hart Chemical Limited: *See—*
Kanluen, Ratana; and Licht, Brigitte H., 4,874,827, Cl. 526-214.000.

Harth, Hubert: *See—*
Richtler, Hans-Joachim; Kreutzer, Udo; Carduck, Franz-Josef; Koester, Klaus; and Harth, Hubert, 4,874,552, Cl. 260-400.000.

Hartman, Guy J., to A. E. Staley Manufacturing Company. Flavoring material possessing fermented soy sauce characteristics. 4,874,625, Cl. 426-533.000.

Hartmann & Lammle GmbH & Co. KG: *See—*
Schulze, Eckehart, 4,873,912, Cl. 91-389.000.

Hase, Takashi; and Yoshida, Hidemi, to Kasei Optonix Limited. Phosphor and electron excited fluorescent display device using the same. 4,874,985, Cl. 313-487.000.

Hasegawa, Akira, to Olympus Optical Co., Ltd. Imaging optical system. 4,874,232, Cl. 350-427.000.

Hashimoto, Masashi, to Texas Instruments Incorporated. Memory device with integrated error detection and correction. 4,875,212, Cl. 371-40.200.

Hashimoto, Ryusuke; and Iwata, Mitsuru, to Fujimi Tile Co., Ltd. Process for producing ceramic products using the sludge obtained by sewage treatment. 4,874,153, Cl. 264-63.000.

Hasircoglu, Alexander W., to Du Pont de Nemours, E. I., and Company. Terminal lead shielding for headers and connectors. 4,874,319, Cl. 439-108.000.

Hasumoto, Toshiharu; Kashiwada, Kunio; Konishi, Minoru; and Fujishiro, Nobuo, to Showa Denko Kabushiki Kaisha. Process for treating waste gases containing trichlorotrifluoroethane and apparatus therefor. 4,874,403, Cl. 55-55.000.

Hata, Hiroyoshi: *See—*
Hisaki, Masakatu; Kashima, Kenichi; Sakamoto, Yasuhiko; Hojo, Masakazu; Katayama, Osamu; and Hata, Hiroyoshi, 4,874,773, Cl. 514-355.000.

Hataishi, Osamu: *See—*
Ueno, Katsunobu; and Hataishi, Osamu, 4,875,085, Cl. 357-34.000.

Hatamura, Yotaro. Die casting controlling method. 4,874,032, Cl. 164-457.000.

Hatanaka, Koji; Maruta, Kenzi; and Suwabe, Hirohisa, to Jidosha Kiki Co., Ltd.; and Hitachi Metals, Ltd. Glow plug for diesel engine with a U-shaped sialon ceramic heater. 4,874,923, Cl. 219-270.000.

Hathorn, Jack L.: *See—*
Scheier, Donald J.; and Hathorn, Jack L., 4,873,746, Cl. 17-11.000.

Hattori, Akimasa: *See—*
Makita, Kensuke; Hattori, Akimasa; and Tanaka, Katsuto, 4,874,462, Cl. 156-635.000.

Hattori, Yutaka, to Yokohama Rubber Co., Ltd., The. Method of removing toner from a rotating drum in a xerographic copying machine using a vibrating blade. 4,875,070, Cl. 355-299.000.

Haughton, Victor M.: *See—*
Lindemann, Peer; and Haughton, Victor M., 4,874,382, Cl. 604-195.000.

Haver & Boecker: *See—*
Mittelbach, Helmut, 4,873,816, Cl. 53-573.000.

Hawkins, Irvin F., Jr. Needle guide assembly. 4,874,376, Cl. 604-165.000.

Hawkins, Mark R.: *See—*
Goodwin, Dennis L.; Hawkins, Mark R.; Johnson, Wayne L.; Olsen, Aage; and Robinson, McDonald, 4,874,464, Cl. 156-646.000.

Hayakawa, Fujio: *See—*
Ito, Toshiyasu; Minoura, Jun; Mori, Takaaki; Takahashi, Shigeyuki; Kato, Mamoru; Shimada, Junichi; and Hayakawa, Fujio, 4,874,229, Cl. 350-357.000.

Hayami, Hiroshi: *See—*
Sugisawa, Ko; Matsumura, Yasushi; Okamoto, Hidefumi; and Hayami, Hiroshi, 4,874,580, Cl. 422-25.000.

Hayashi, Hideo: *See—*
Wakabayashi, Makoto; Fujiwara, Kenichi; and Hayashi, Hideo, 4,874,836, Cl. 528-185.000.

Hayashi, Shigeyuki: *See—*
Sangyoji, Kazuo; Sakai, Jun; Hayashi, Shigeyuki; Suzuki, Makoto; and Kimura, Yasuo, 4,875,074, Cl. 355-27.000.

Hayes, James K.: *See—*
Crick, David L.; and Hayes, James K., 4,874,041, Cl. 165-162.000.

Hayes, Thomas J.: *See—*
Antoni, Patricia A.; Nolan, Timothy J.; Hayes, Thomas J.; Arneson, Theodore R.; and Coleman, Jerry E., 4,874,083, Cl. 206-45.320.

Hazelton, Donald R.; and Hodgson, William J., Jr., to Exxon Chemical Patents, Inc. Melt blown nonwoven web from fiber comprising an elastomer. 4,874,447, Cl. 156-167.000.

Heat-Fab, Inc.: *See—*
Green, Lloyd C., 4,874,191, Cl. 285-332.300.

Hediger, Edwin A.; Ng, Yee S.; and Pham, Hieu, to Eastman Kodak Company. Modular optical printhead for hard copy printers. 4,875,057, Cl. 346-107.00R.

Heher, Werner: *See—*
Grobecker, Hermann; Heher, Werner; Zielasek, Adelbert; and Nusselder, Frederik B., 4,874,085, Cl. 206-309.000.

Heid, Edmund. Steerable kite. 4,874,146, Cl. 244-153.00R.

Heidt, Thomas; and Wickstead, James C., to Wickstead, James C. Camcorder. 4,875,107, Cl. 360-9.100.

Heilmann, Steven M.: *See—*
Rasmussen, Jerald K.; Heilmann, Steven M.; Krepski, Larry R.; and Moren, Dean M., 4,874,822, Cl. 525-279.000.

Heimerl, Albert; Brammer, Hans-Adolf; and Hofeditz, Wolfgang, to Beiersdorf Aktiengesellschaft. Adapter device for irrigating the intestine. 4,874,370, Cl. 604-93.000.

Heinzle, Otto, to Jugo-Import-Export-Anstalt. Segmental formwork for round structures. 4,874,150, Cl. 249-18.000.

Heisey, Raymond K., Jr.; Barker, W. David; Mariano, Arturo C.; and Thurnau, Vernon L., to Butler Manufacturing Company. Spacer block for standing seam roof. 4,873,808, Cl. 52-478.000.

Heisey, William L.: *See—*
Armstrong, Richard J.; and Granzotto, Robert, 4,874,143, Cl. 242-198.000.

Heitman, Jurgen, to Robert Bosch GmbH. Method and apparatus for concealing errors in reproduced digital signals utilizing fir filter. 4,875,106, Cl. 358-314.000.

Heitz, Walter L., to Shell Oil Company. Coal gasification process. 4,874,397, Cl. 48-210.000.

Helix Technology Corporation: *See—*
Pruitt, Gerald R.; and Bertsch, Peter, 4,873,913, Cl. 92-158.000.

Heller, Cletas, to Heller Triangle Spring Co. Multi-compartment refuse container. 4,874,111, Cl. 220-404.000.

Heller Triangle Spring Co.: *See*—
Heller, Cletas, 4,874,111, Cl. 220-404.000.

Henderson, Eric A., to Sundstrand Corporation. Electrical power generating system having parallel generator control. 4,874,961, Cl. 307-87.000.

Henderson, Norman: *See*—
Urban, Joseph J., Jr.; Henderson, Norman; and Behe, Anthony J., 4,874,605, Cl. 424-78.000.

Henderson, Tommy L. Mechanical roping dummy. 4,874,179, Cl. 273-338.000.

Hendrickson, Donald W. Screen and flow regulator assembly. 4,874,017, Cl. 138-45.000.

Henkel Corporation: *See*—
Donovan, Joseph C.; and Ahmed, Bashir M., 4,874,673, Cl. 428-463.000.
Sonoda, Sakae; Hetsugi, Kouji; Sawasaki, Yoshihiko; Kaburagi, Kouji; and Matsushima, Yasunobu, 4,874,480, Cl. 204-56.100.

Henkel France S.A.: *See*—
Freal-Saison, Jean-Michel, 4,874,498, Cl. 204-400.000.

Henkel Kommanditgesellschaft auf Aktien: *See*—
Lange, Fritz; Busch, Peter; and Thiele, Klaus, 4,874,554, Cl. 260-404.000.
Richtler, Hans-Joachim; Kreutzer, Udo; Carduck, Franz-Josef; Koester, Klaus; and Harth, Hubert, 4,874,552, Cl. 260-400.000.
Schmid, Karl-Heinz; Penninger, Josef; and Moeller, Hinrich, 4,874,579, Cl. 422-16.000.
Uphues, Guenter; Ploog, Uwe; and Bischof, Klaudia, 4,874,883, Cl. 558-150.000.

Henley, Alvera S. Vehicle passenger seat for handicapped persons. 4,874,203, Cl. 297-250.000.

Henley, Francois G.; Choi, Hee-June; Kratzer, Dean J.; and Barr, Maurice R., to Photon Dynamics, Inc. Ultra-high-speed digital test system using electro-optic signal sampling. 4,875,006, Cl. 324-158.00R.

Hennenfent, Douglas J.: *See*—
Vadnais, Timothy W.; and Hennenfent, Douglas J., 4,874,922, Cl. 219-243.000.

Hensens, Otto: *See*—
Huang, Leeyuan; Koupal, Lawrence; Dunn, Joseph, Jr.; Liesch, Jerrold M.; Hensens, Otto; and Woodruff, H. Boyd, 4,874,745, Cl. 514-18.000.

Hensley, John J.: *See*—
Cang, John N.; Gast, Joseph R.; Hensley, John J.; and Waldhelm, Christian M., 4,874,290, Cl. 415-173.400.

Henton, David E.: *See*—
Bubeck, Robert A.; Clipper, Robert B.; and Henton, David E., 4,874,815, Cl. 525-71.000.

Henzi, Beat, to Sandoz Ltd. Monoazo dyes having a substituted 1,4-phenylene coupling component radical having one C_{8-14} alkyl group or moiety. 4,874,392, Cl. 8-662.000.

Heppke, Gerd; Scherowsky, Gunter; Bahr, Christian; and Lehmann, Lutz, to Hoechst Aktiengesellschaft. Chiral esters of α-substituted phenylalkanoic acids and mesogenic hydroxy compounds, and their use as a doping substance in liquid crystal phases. 4,874,545, Cl. 252-299.610.

Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., to Mobil Oil Corporation. Multiple riser fluidized catalytic cracking process employing a mixed catalyst. 4,874,503, Cl. 208-67.000.

Hercules Incorporated: *See*—
Lukacs, Alexander, III, 4,874,828, Cl. 526-262.000.

Hermans, Albert L. Low power, leakage current switching circuit. 4,874,962, Cl. 307-116.000.

Herrmann, Donald C. Universal heat exchanger. 4,874,040, Cl. 165-122.000.

Hertling, David R.: *See*—
Hughes, David W.; Feeney, Robert K.; and Hertling, David R., 4,874,711, Cl. 437-8.000.

Hertrich, Friedrich R., to Digital Equipment Corporation. Brushless DC motor. 4,874,975, Cl. 310-186.000.

Herwig, Lewis F. Adjustable stringplate mounting means for a grand piano. 4,873,906, Cl. 84-184.000.

Hesketh, Mark L., to E. R. Squibb and Sons, Inc. Catheter retaining device. 4,874,380, Cl. 604-180.000.

Hess, John M, III: *See*—
Kulle, Lee; Desecki, Vince; and Hess, John M, III, 4,874,369, Cl. 604-86.000.

Hetsugi, Kouji: *See*—
Sonoda, Sakae; Hetsugi, Kouji; Sawasaki, Yoshihiko; Kaburagi, Kouji; and Matsushima, Yasunobu, 4,874,480, Cl. 204-56.100.

Heubel, Thomas W.: *See*—
Moran, John P.; Gilson, Richard W.; and Heubel, Thomas W., 4,874,385, Cl. 604-208.000.

Heuschen, Jean M.: *See*—
Lee, Gim F., Jr.; Heuschen, Jean M.; and Van Der Meer, Roelof, 4,874,810, Cl. 524-505.000.

Heuschkel, Uwe. Method and device for producing shaped objects from thermoplastic plastics. 4,874,566, Cl. 264-40.200.

Hewlett-Packard Company: *See*—
Huang, Fred G., 4,875,205, Cl. 370-6.000.
Hunt, Thomas J.; Miller, James G.; Thomas, Lewis J., III; Melton, Hewlett E., Jr.; and Shoup, Thomas A., 4,873,984, Cl. 128-660.070.

Heywood, Richard G.: *See*—
Clark, Gary E., 4,874,182, Cl. 280-30.000.

Higashi, Kazumi; and Noda, Yuzuru, to Nitto Electric Industrial Co., Ltd. Colorless transparent polyimide shaped article and process for producing the same. 4,874,834, Cl. 528-176.000.

Higashi, Tatsuji: *See*—
Urabe, Yoshihiko; Higashi, Tatsuji; Takahashi, Hiroshi; and Kita, Nobuyuki, 4,874,686, Cl. 430-272.000.

Highe, Albert: *See*—
Reed, James P.; Masia, Michael; and Highe, Albert, 4,874,487, Cl. 204-147.000.

Higuchi, Ryoichi; Sakurai, Takao; Yokota, Tadahiko; Mikami, Naoko; Yamamoto, Eri; and Takeuchi, Koji, to Ajinomoto Co., Inc. Phenylpyrimidine liquid crystal compounds and liquid crystal compositions containing the same. 4,874,542, Cl. 252-299.610.

Higuchi, Tadashi: *See*—
Kawanishi, Shozo; and Higuchi, Tadashi, 4,874,048, Cl. 177-25.180.

Hikes, Carl L.: *See*—
Andersen, James K.; and Hikes, Carl L., 4,874,324, Cl. 439-271.000.

Hildebrandt, Gunter: *See*—
Gehrt, Heinz H.; Hildebrandt, Gunter; and Rehfeldt, Karl-Heinz, 4,874,966, Cl. 307-291.000.

Hill, Francis V.; and Crosswhite, Lola E., to Sorrento Engineer, Inc. Method of making flame resistant polyimide foam insulation and the resulting insulation. 4,874,648, Cl. 428-35.900.

Hillard, Devere D. Apparatus and method for simulating the game of golf. 4,874,167, Cl. 273-14.000.

Hillegass, Donald V.: *See*—
Goldberg, Jay R.; and Hillegass, Donald V., 4,874,360, Cl. 604-8.000.

Hillstead, Richard A., to Cordis Corporation. Catheter sheath introducer. 4,874,378, Cl. 604-167.000.

Hilton Davis Co.: *See*—
Kannan, Ramamurthi, 4,874,894, Cl. 564-93.000.

Hirai, Hidetoshi: *See*—
Ito, Tomohito; Isomura, Renichi; Hirai, Hidetoshi; and Gomi, Fukuo, 4,874,495, Cl. 204-212.000.

Hiraishi, Shigetoshi; Koike, Naomasa; Kondo, Kazuyoshi; and Fuchigami, Mitsuru, to Mitsubishi Paper Mills, Ltd. Thermosensitive recording material. 4,874,740, Cl. 503-201.000.

Hirano, Tsumoru: *See*—
Yamanouchi, Junichi; Ono, Shigetoshi; Hirano, Tsumoru; Watanabe, Toshiyuki; Sakai, Nobuo; and Mihayashi, Keiji, 4,874,689, Cl. 430-548.000.

Hiraoka, Hiroyuki: *See*—
Dickstein, Heidi L.; Hiraoka, Hiroyuki; and Lee, James H., 4,875,124, Cl. 360-126.000.

Hirata, Kiminori: *See*—
Ogura, Tomoyuki; Kawamura, Yasuo; Ishii, Shigeru; Baba, Masatoshi; Taniguchi, Masakazu; Hirose, Masayoshi; Hirata, Kiminori; and Ochiai, Yoshinori, 4,874,861, Cl. 544-229.000.

Hirata, Kimio; and Saito, Yasuo, to Toshiba Monofrax Co., Ltd. Refractory unit for a heat regenerator. 4,874,034, Cl. 165-9.100.

Hirayama Setsubi Kabushiki Kaisha: *See*—
Hirayama, Shoji, 4,873,914, Cl. 98-31.600.

Hirayama, Shoji, to Hirayama Setsubi Kabushiki Kaisha. Clean room system and unit for the same clean room system. 4,873,914, Cl. 98-31.600.

Hirose, Fumio: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,874,750, Cl. 514-42.000.

Hirose, Masayoshi: *See*—
Ogura, Tomoyuki; Kawamura, Yasuo; Ishii, Shigeru; Baba, Masatoshi; Taniguchi, Masakazu; Hirose, Masayoshi; Hirata, Kiminori; and Ochiai, Yoshinori, 4,874,861, Cl. 544-229.000.

Hirose, Noboru: *See*—
Yamane, Hisaaki; and Hirose, Noboru, 4,873,756, Cl. 29-568.000.

Hirose, Takashi: *See*—
Yanagida, Kouichi; Kano, Shinichiro; Gotou, Takeshi; and Hirose, Takashi, 4,874,062, Cl. 181-250.000.

Hirota, Minoru: *See*—
Matsukawa, Hideki; Masuyama, Takeshi; Hirota, Minoru; Wakahata, Yasuo; Itoh, Masahiro; and Harada, Shinji, 4,874,227, Cl. 350-334.000.

Hisaki, Masakatu; Kashima, Kenichi; Sakamoto, Yasuhiko; Hojo, Masakazu; Katayama, Osamu; and Hata, Hiroyoshi, to Nippon Shoji Kabushiki Kaisha. 3-Aminocarbonyl-1,4-dihydropyridine-5-carboxylic acid compounds, and pharmaceutical composition containing the same. 4,874,773, Cl. 514-355.000.

Hitachi Cable Ltd.: *See*—
Hongo, Akihito; Shiota, Tsuneo; Nishida, Shigeo; Miyagi, Mitsunobu; and Wagatsuma, Yoshihiko, 4,875,218, Cl. 372-64.000.

Hitachi, Ltd.: *See*—
Baba, Shiro, 4,875,047, Cl. 341-155.000.
Furuhashi, Koshi; Miyazaki, Satoshi; Furuya, Masakazu; Kawatobi, Tatsuo; Kouyama, Sinichi; and Kashio, Jiro, 4,875,208, Cl. 370-94.100.
Igarashi, Takao; Sugawara, Satoshi; Yoshimoto, Yuichiro; Saito, Shozo; Fukumoto, Takashi; Endo, Zenichiro; and Shinbo, Katsutoshi, 4,874,574, Cl. 376-333.000.
Kamifuji, Hiroshi; Tanabe, Yoshiyuki; and Morita, Kiyomi, 4,873,960, Cl. 123-480.000.
Kato, Yoshiaki, 4,874,944, Cl. 250-288.000.
Kazama, Saburo; and Tamura, Akira, 4,875,110, Cl. 360-64.000.
Kimura, Hiroshi; Naito, Shotaro; Miyashita, Kunio; Noto, Yasuo; Sugiura, Noboru; Takahashi, Tadashi; Yamamura, Hirohisa;

Yamashita, Seizi; Kawamata, Syooichi; Tajima, Fumio; and Horikoshi, Shigeru, 4,874,053, Cl. 180-79.100.
Kuwabara, Takao; and Takahashi, Kazuo, 4,874,999, Cl. 318-610.000.
Maeda, Akira; Sano, Koichi; Yokoyama, Tetsuo; Koizumi, Hideaki; and Mizuno, Hirotaka, 4,875,012, Cl. 324-309.000.
Matsumoto, Tetsuro, 4,875,192, Cl. 365-193.000.
Murakami, Yoshiki; Yamamoto, Etsuji; Yabusaki, Masao; and Kohno, Hideki, 4,875,013, Cl. 324-318.000.
Sakurai, Shigeo; Umezawa, Sadao; Usami, Saburo; Miyata, Hiroshi; Toriya, Hajime; Tsubouchi, Kuniyoshi; and Kaneko, Ryoichi, 4,875,170, Cl. 364-507.000.
Shimizu, Toshihiko; Hotta, Masao; and Maio, Kenji, 4,875,048, Cl. 341-156.000.
Tokisue, Hiromitsu; Tsumaki, Nobuo; and Koike, Toshifumi, 4,874,273, Cl. 406-88.000.
Yokosawa, Koichi; Yamamoto, Etsuji; Nakane, Hideaki; Yabusaki, Masao; and Ogura, Yukiko, 4,875,010, Cl. 324-248.000.

Hitachi Maxell, Ltd.: *See*—
Asada, Seiichi; Sueyoshi, Toshinobu; and Miyake, Akira, 4,874,668, Cl. 428-403.000.
Tanaka, Yoshito; and Umebayashi, Nobuhiro, 4,875,121, Cl. 360-129.000.

Hitachi Metals, Ltd.: *See*—
Hatanaka, Koji; Maruta, Kenzi; and Suwabe, Hirohisa, 4,874,923, Cl. 219-270.000.
Shibata, Ryoichi; and Kasakoshi, Toshiyuki, 4,874,927, Cl. 219-469.000.

Hitomi, Yasuhiro, to Shimano Industrial Company Limited. Fishing reel. 4,874,140, Cl. 242-223.000.

Hixon, Charles E., to Cummins Engine Company, Inc. Method and apparatus for retaining roller cone of drill bit. 4,874,047, Cl. 175-369.000.

Hochstrasser, Denis F., to Bio-Rad Laboratories, Inc. Pre-cast gel systems for two-dimensional electrophoresis. 4,874,490, Cl. 204-182.100.

Hodgson, Peter C. Slow release berley. 4,874,607, Cl. 424-84.000.

Hodgson, William J., Jr.: *See*—
Hazelton, Donald R.; and Hodgson, William J., Jr., 4,874,447, Cl. 156-167.000.

Hoechst Aktiengesellschaft: *See*—
Deasy, Patrick B., 4,874,612, Cl. 424-425.000.
Heppke, Gerd; Scherowsky, Gunter; Bahr, Christian; and Lehmann, Lutz, 4,874,545, Cl. 252-299.610.
Kruse, Alfred; Siegemund, Gunter; and Schwertfeger, Werner, 4,874,557, Cl. 562-851.000.

Hoechst Celanese: *See*—
Watts, Michael P. C.; Perera, Thiloma I.; Myers, David W.; Ozaraki, Robert G.; Schipper, John F.; and Tan, Raul V., 4,874,240, Cl. 356-73.000.

Hoechst-Roussel Pharmaceuticals Inc.: *See*—
Urban, Joseph J., Jr.; Henderson, Norman; and Behe, Anthony J., 4,874,605, Cl. 424-78.000.

Hoelderich, Wolfgang; Hupfer, Leopold; and Schneider, Kurt, to BASF Aktiengesellschaft. Preparation of unsaturated and saturated ketones. 4,874,899, Cl. 568-386.000.

Hofeditz, Wolfgang: *See*—
Heimerl, Albert; Brammer, Hans-Adolf; and Hofeditz, Wolfgang, 4,874,370, Cl. 604-93.000.

Hofen, Willi: *See*—
Dankowski, Manfred; and Hofen, Willi, 4,874,556, Cl. 562-2.000.

Hofer, Gerald: *See*—
Fehlmann, Wolfgang; Hofer, Gerald; Junger, Dieter; Karle, Anton; and Laufer, Helmut, 4,873,956, Cl. 123-357.000.

Hoffart, Andrew B., to American Display Inc. Hinged illuminated sign. 4,873,776, Cl. 40-572.000.

Hoffer, John C.: *See*—
Bowen, Terry P.; Harms, Sherry J.; and Hoffer, John C., 4,874,218, Cl. 350-96.200.

Hofmann, Ingrid; Mutschler, Ernst; and Christner, Angelika, to Roehm GmbH Chemische Fabrik. Pharmaceutically efficacious pteridine derivatives. 4,874,763, Cl. 514-249.000.

Hojo, Masakazu: *See*—
Hisaki, Masakatu; Kashima, Kenichi; Sakamoto, Yasuhiko; Hojo, Masakazu; Katayama, Osamu; and Hata, Hiroyoshi, 4,874,773, Cl. 514-355.000.

Holland, Carmon D.: *See*—
Shook, Hal C.; and Holland, Carmon D., 4,873,738, Cl. 14-1.000.

Hollander, Jan, to B.V. Asphalt-en Chemische Fabrieken Smid and Hollander. Perforated roofing material and a method of manufacturing the same. 4,874,652, Cl. 428-137.000.

Hollis Jr, Ralph L., to International Business Machines Corporation. Magnetically levitated fine motion robot wrist with programmable compliance. 4,874,998, Cl. 318-568.210.

Holmes, Harlan K.; Moore, Thomas C., Jr.; and Fantl, Andrew J., to United States of America, National Aeronautics and Space Administration; and Virginia Commonwealth University. Circumferential pressure probe. 4,873,990, Cl. 128-748.000.

Holmsen, Theodore W.: *See*—
Kleschick, William A.; Secor, Jacob; and Holmsen, Theodore W., 4,874,421, Cl. 71-9.00H.

Homan, Donald A. Marine toilet deodorant dispenser. 4,873,727, Cl. 4-226.000.

Homberger, Heinrich; Timm, Jurgen; and Rodriques, Pedro, to Swiss Aluminium Ltd. Aluminium alloy for superplastic forming. 4,874,578, Cl. 420-541.000.

Honda Giken Kogyo Kabushiki Kaisha: *See*—
Fujiyoshi, Yoshihiro; Aoki, Takatoshi; and Urata, Yasuhiro, 4,873,949, Cl. 123-90.120.

Honda, Hajime. Surface tensiometer and concentration controlling device. 4,874,426, Cl. 73-64.400.

Honda, Toshio: *See*—
Kametani, Tetsuji; and Honda, Toshio, 4,874,551, Cl. 260-397.100.

Honders, Anthonie; Horstik, Alfred J.; and Van Eyden, Gerbrand J. M., to Shell Internationale Research Maatschappij B.V. Process for the electroytic production of non-metals. 4,874,482, Cl. 204-60.000.

Honeyman, Henry W., III. Locking system for securing valuables. 4,873,848, Cl. 70-14.000.

Honeywell Inc.: *See*—
Benson, David J.; and Burroughs, James A., 4,874,992, Cl. 315-387.000.

Hongo, Akihito; Shiota, Tsuneo; Nishida, Shigeo; Miyagi, Mitsunobu; and Wagatsuma, Yoshihiko, to Hitachi Cable Ltd. Thin-film coated waveguide laser. 4,875,218, Cl. 372-64.000.

Hona, Douglas A., to Eastman Kodak Company. Mechanism for accurately mounting an electronic light emitting printhead assembly. 4,875,153, Cl. 346-155.000.

Hope Sexton: *See*—
Strausser, Richard A., 4,874,084, Cl. 206-231.000.

Hopmans, Franciscus P. M.: *See*—
Van Twist, Robert A. H.; Hopmans, Franciscus P. M.; and Odijk, Eddy A. M., 4,875,207, Cl. 370-85.120.

Hopner, Emil: *See*—
Dost, Martin H.; Hopner, Emil; Melas, Constantin M.; and Provazek, Lionel D., 4,875,112, Cl. 360-65.000.

Horaguchi, Yoichi: *See*—
Ueda, Masashi; Horaguchi, Yoichi; and Sakakibara, Kenji, 4,875,073, Cl. 355-27.000.

Hori, Kenji: *See*—
Sugimura, Tuyoshi; Hori, Kenji; and Oba, Kiyoyuki, 4,873,917, Cl. 99-355.000.

Horibe, Isao: *See*—
Takeda, Ken'ichi; and Horibe, Isao, 4,874,898, Cl. 568-369.000.

Horikoshi, Shigeru: *See*—
Kimura, Hiroshi; Naito, Shotaro; Miyashita, Kunio; Noto, Yasuo; Sugiura, Noboru; Takahashi, Tadashi; Yamamura, Hirohisa; Yamashita, Seizi; Kawamata, Syooichi; Tajima, Fumio; and Horikoshi, Shigeru, 4,874,053, Cl. 180-79.100.

Horsfield, Edward A.: *See*—
Wood, Ian A.; and Horsfield, Edward A., 4,874,573, Cl. 376-272.000.

Horst, Jenny: *See*—
Kiss, Akos; Kleinschmit, Peter; Hanich, Juergen; Halbritter, Guenter; and Horst, Jenny, 4,874,433, Cl. 106-450.000.

Horstik, Alfred J.: *See*—
Honders, Anthonie; Horstik, Alfred J.; and Van Eyden, Gerbrand J. M., 4,874,482, Cl. 204-60.000.

Hoshi, Junji: *See*—
Wakita, Saburo; and Hoshi, Junji, 4,874,577, Cl. 420-417.000.

Hoshide, Fumitoshi: *See*—
Yamamoto, Shinobu; Hoshide, Fumitoshi; Takeuchi, Michikazu; Kotani, Shou; and Yasuda, Sumihiro, 4,874,924, Cl. 219-274.000.

Hosiden Electronics Co., Ltd.: *See*—
Kakuta, Toshio; and Nagano, Hiroyuki, 4,874,912, Cl. 200-16.00D.

Hosokawa, Hiroshi: *See*—
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.

Hotta, Masao: *See*—
Shimizu, Toshihiko; Hotta, Masao; and Maio, Kenji, 4,875,048, Cl. 341-156.000.

Houjyo, Hisao: *See*—
Nakagawa, Yoshitomo; Kaito, Takashi; Houjyo, Hisao; and Yamamoto, Masahiro, 4,874,632, Cl. 427-41.000.

House, David W.; and Scott, Ray V., Jr., to UOP. Room-temperature-cured polyurethanes and polyureas. 4,874,831, Cl. 528-48.000.

House Food Industrial Company Limited: *See*—
Sugisawa, Ko; Matsumura, Yasushi; Okamoto, Hidefumi; and Hayami, Hiroshi, 4,874,580, Cl. 422-25.000.

House Food Industries, Co.: *See*—
Sengoku, Koji; and Nagatome, Yoshiaki, 4,874,630, Cl. 426-634.000.

Houser, Philip H., to Proctor-Silex, Inc. Toaster oven/broiler with continuously energized indicator. 4,874,929, Cl. 219-506.000.

Howard, Richard E.: *See*—
Graf, Hans P.; and Howard, Richard E., 4,875,183, Cl. 364-807.000.

Howes, H. Frank: *See*—
Mathewes, James K., Jr.; Chancellor, Craig A.; and Howes, H. Frank, 4,875,209, Cl. 371-3.000.

HRI, Inc.: *See*—
MacArthur, James B.; Comolli, Alfred G.; and McLean, Joseph B., 4,874,506, Cl. 208-413.000.

Hsiao, Charles, to Baker Cummins Pharmaceuticals, Inc. Taste concealing pharmaceutical dosage unit. 4,874,613, Cl. 424-458.000.

Hsu, Shing-Wang. Coupling member for securing a drilling head to the rotatable rod of a pneumatic tool body. 4,874,181, Cl. 279-1.00A.

Huang, Chialang; and Vernice, Gerald G., to BOC, Inc. Method for the preparation of fluoromethyl 1,1,1,3,3,3-hexafluoro-2-propyl ether. 4,874,902, Cl. 568-683.000.

Huang, Fred G., to Hewlett-Packard Company. Crosstalk reduction in unshielded twisted-pair lines. 4,875,205, Cl. 370-6.000.

Huang, Leeyuan; Koupal, Lawrence; Dunn, Joseph, Jr.; Liesch, Jerrold M.; Hensens, Otto; and Woodruff, H. Boyd, to Merck & Co., Inc. Renin-inhibitory pepstatin phenyl derivatives. 4,874,745, Cl. 514-18.000.

Huang, Tien-Tsai. Pressure gauge with a movable interior scale. 4,873,864, Cl. 73-146.800.

Huard, Jeff, to National Semiconductor Corporation. ESD low resistance input structure. 4,875,130, Cl. 361-56.000.

Hubbell Incorporated: *See*—
Schnell, Kenneth R.; and Kesler, Gregory J., 4,874,905, Cl. 174-65.00R.

Huber, Otto L.: *See*—
Magidson, Mark; and Huber, Otto L., 4,873,972, Cl. 128-206.120.

Hudson Valley Metal Works, Inc.: *See*—
Anderson, Dean H.; and Tomann, Mark M., 4,875,052, Cl. 343-882.000.

Huebsch, Donald L. Method and apparatus for removal of bone cement. 4,873,969, Cl. 128-92.00R.

Huels Aktiengesellschaft: *See*—
Seipenbusch, Reinhold, 4,874,700, Cl. 435-145.000.

Huffman, K. Robert, to American Cyanamid Company. Carboxy hydroxamic acid polymers and their use as detergent additives. 4,874,539, Cl. 252-174.240.

Hughes Aircraft Company: *See*—
Dehne, Axel G., 4,873,831, Cl. 62-6.000.
Oldham, Susan L.; Elias, William E.; Bigus, Stephen J.; and Lau, Kreisler S. Y., 4,874,643, Cl. 427-340.000.
O'Meara, Thomas R., 4,874,223, Cl. 350-163.000.

Hughes, David W.; Feeney, Robert K.; and Hertling, David R., to Georgia Tech Research Corporation. Method for altering characteristics of active semiconductor devices. 4,874,711, Cl. 437-8.000.

Hughes, John L., to Australian Electro Optics Pty. Ltd. Fibre communication laser system. 4,875,215, Cl. 372-6.000.

Huhmann, Douglas J.: *See*—
Bai, Monty W.; and Huhmann, Douglas J., 4,873,871, Cl. 73-777.000.

Huhn, Karl, to Wacker-Chemie GmbH. Process for impregnating organic fibers. 4,874,662, Cl. 428-266.000.

Hujieda, Yasuhiko: *See*—
Ichikawa, Katumi; Amano, Itaru; Hujieda, Yasuhiko; Misumi, Shikao; Hukumura, Seisuke; and Miyauchi, Hideo, 4,874,303, Cl. 425-28.100.

Hukumura, Seisuke: *See*—
Ichikawa, Katumi; Amano, Itaru; Hujieda, Yasuhiko; Misumi, Shikao; Hukumura, Seisuke; and Miyauchi, Hideo, 4,874,303, Cl. 425-28.100.

Hull, Alan. Lift-tab container opener. 4,873,896, Cl. 81-3.270.

Hultberg, Sten; and Hansson, Birger, to Jimek International AB. Spray nozzle and valve assembly. 4,873,925, Cl. 101-147.000.

Humphrey, Thomas. Stringed musical instrument. 4,873,909, Cl. 84-293.000.

Humphries, Darral V.: *See*—
Lo, Ying-Cheng; and Humphries, Darral V., 4,874,657, Cl. 428-220.000.

Hung, Paul L. K.; and Tseng, Kenneth K. S., to M&T Chemicals Inc. Aqueous akaline developable, UV curable urethane acrylate compounds and compositions useful for forming liquid 100 percent solids, solvent-free solder mask coatings. 4,874,799, Cl. 522-96.000.

Hunold, Michael, to Siemens Aktiengesellschaft. X-ray video system and method for the transillumination of an examination subject. 4,875,225, Cl. 378-99.000.

Hunt, Thomas J.; Miller, James G.; Thomas, Lewis J., III; Melton, Hewlett E., Jr.; and Shoup, Thomas A., to Hewlett-Packard Company. Techniques for calculating ultrasonic integrated backscatter using frequency or time domain techniques. 4,873,984, Cl. 128-660.070.

Hupfer, Leopold: *See*—
Hoelderich, Wolfgang; Hupfer, Leopold; and Schneider, Kurt, 4,874,899, Cl. 568-386.000.

Hurd, Marvin G. Groove cutter for concrete bores. 4,874,046, Cl. 175-292.000.

Hurley, Irvin H., Jr., to Tilcon Tomasso. Front dispensing truck with vertically and horizontally swingable screw conveyor. 4,874,283, Cl. 414-504.000.

Huse, Syoji: *See*—
Hara, Toshihiro; Yotsutani, Akio; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, 4,875,231, Cl. 379-61.000.

Hutchins, Roger W. Deep water transient sound generator. 4,875,199, Cl. 367-175.000.

Huth, Andreas; Sauer, Gerhard; and Wachtel, Helmut, to Schering Aktiengesellschaft. 1,2-disubstituted ergolines useful for producing central antidopanminergic or α2-receptor-blocking activity. 4,874,768, Cl. 514-288.000.

Huwelmann, Helmut: *See*—
Tetenborg, Konrad; Eschmann, Heinz; and Huwelmann, Helmut, 4,873,815, Cl. 53-570.000.

Hwang, Yu-Tsang G., to Republic Electronics Company. Miniature digital computer circuit for determining values of combined varying quantities. 4,875,182, Cl. 364-732.000.

Hyon, Suong-Hyu; and Ikada, Yoshito, to Biomaterials Universe, Inc. Method of molding a polyvinyl alcohol contact lens. 4,874,562, Cl. 264-1.400.

I.D. Tech Ltd.: *See*—
Ariav, Arie, 4,875,198, Cl. 367-93.000.

IBP, Inc.: *See*—
Couture, William F., 4,873,749, Cl. 17-50.000.

Ichihara, Isao: *See*—
Yamada, Ichiji; Inuzuka, Yutake; Ichihara, Isao; Murakami, Michiyuki; Suzuki, George; Yanahashi, Ryou; and Kondo, Takeshi, 4,873,884, Cl. 74-473.00P.

Ichikawa, Katumi; Amano, Itaru; Hujieda, Yasuhiko; Misumi, Shikao; Hukumura, Seisuke; and Miyauchi, Hideo, to Kabushiki Kaisha Kobe Seiko Sho. Tire vulcanizing press. 4,874,303, Cl. 425-28.100.

Ichikoh Industries Limited: *See*—
Fujiki, Hiroyuki; Michiura, Yoshiharu; and Inoue, Kiyoshi, 4,874,645, Cl. 428-31.000.

Ichinomiya, Yutaka: *See*—
Funaki, Masaaki; Kunihiro, Koki; and Ichinomiya, Yutaka, 4,874,654, Cl. 428-192.000.

ICI Americas Inc.: *See*—
Woolard, Frank X., 4,874,422, Cl. 71-95.000.
Woolard, Frank X., 4,874,873, Cl. 548-540.000.

Ide, Mitsuteru: *See*—
Mine, Kazuhiro; Sanada, Kei; and Ide, Mitsuteru, 4,874,980, Cl. 310-328.000.

Idemitsu Petrochemical Co., Ltd.: *See*—
Wakabayashi, Makoto; Fujiwara, Kenichi, and Hayashi, Hideo, 4,874,836, Cl. 528-185.000.

Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, to Ricoh Company, Ltd. Electrostatic recording apparatus. 4,875,063, Cl. 346-160.100.

Igarashi, Takao; Sugawara, Satoshi; Yoshimoto, Yuichiro; Saito, Shozo; Fukumoto, Takashi; Endo, Zenichiro; and Shinbo, Katsutoshi, to Hitachi, Ltd. Control rod. 4,874,574, Cl. 376-333.000.

Iguchi, Tatsuya, to Nifco, Inc. Fastener. 4,874,276, Cl. 411-48.000.

Iida Industry Co., Ltd.: *See*—
Kitoh, Osamu; and Ohashi, Masahiko, 4,874,650, Cl. 428-68.000.

Iida, Katsumi: *See*—
Ezaki, Hiroshi; Kobayashi, Yoneji; and Iida, Katsumi, 4,874,171, Cl. 273-77.00A.

Iimura, Seiji; Abe, Yoshio; Okumura, Jun; Naito, Takayuki; and Kamachi, Hajime, to Bristol-Myers Company. 3-(substituted)propenyl-7-(aminothiazolylacetamido) ceph-3-em-4-carboxylic acids and esters thereof. 4,874,856, Cl. 540-222.000.

Ikada, Yoshito: *See*—
Hyon, Suong-Hyu; and Ikada, Yoshito, 4,874,562, Cl. 264-1.400.

Ikebe, Tsuguo: *See*—
Tahara, Tetsuya; Ikebe, Tsuguo; Hakamada, Ichiro; and Yaoka, Osamu, 4,874,759, Cl. 514-232.500.

Ikegami, Eitaro: *See*—
Minamisawa, Tsuyoshi; Endo, Katsunori; Ikegami, Eitaro; and Nezu, Shigeru, 4,874,800, Cl. 523-205.000.

Ikehata, Toshihiko: *See*—
Koshiba, Nobuharu; Ikehata, Toshihiko; and Takata, Kenichi, 4,874,680, Cl. 429-197.000.

Ikemoto, Isao: *See*—
Sootome, Sumitoshi; Mizutani, Morikazu; Ikemoto, Isao; Kanemitsu, Shinji; Kitajima, Hajime; and Onoda, Shigeyoshi, 4,875,075, Cl. 355-50.000.

Ikezaki, Yoshiyuki: *See*—
Sakaida, Atsuo; Chikaoka, Yasuji; Imoto, Yasuo; Iriguchi, Akira; and Ikezaki, Yoshiyuki, 4,874,978, Cl. 310-328.000.

Ikuta, Kazuo: *See*—
Ochiai, Hironori; Suzuki, Etsuo; and Ikuta, Kazuo, 4,874,202, Cl. 296-222.000.

Ikuzawa, Masanori: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,874,750, Cl. 514-42.000.

Iliff, Robert J.: *See*—
Peterson, David; Chen, Loren; and Iliff, Robert J., 4,874,537, Cl. 252-99.000.

Im, Jang-hi: *See*—
Chau, C. C.; and Im, Jang-hi, 4,874,568, Cl. 264-49.000.

Imada, Isuke: *See*—
Terao, Shinji; Okazaki, Hisayoshi; and Imada, Isuke, 4,874,752, Cl. 536-55.200.

Imamura, Makoto; and Miyamoto, Ryouichi, to Kabushiki Kaisha Toshiba. Film carrier and a method for manufacturing a semiconductor device utilizing the same. 4,874,086, Cl. 206-330.000.

Imaoka, Shinichi: *See*—
Nishimoto, Yoshiro; Yoneda, Yasuji; Imaoka, Shinichi; Nakai, Yasuhide; Nakaue, Akimitsu; Onishi, Yoshihiko; Tachibana, Hiroyuki; Inoue, Takayoshi; Kusaka, Takuya; Takamatsu, Hiroyuki; Tojyo, Shigeki; Kajikawa, Hiroshi; and Nishimura, Kozo, 4,874,939, Cl. 250-211.00J.

Imberge, Paul: *See*—
Hager, Jorg; Ghyczy, Miklos; Feyen, Vincent; Imberge, Paul; Brandenburg, Ulrich; and Wilperath, Peter, 4,874,553, Cl. 260-403.000.

Imi-Tech Corporation: *See*—
Ferro, Gregory A., 4,874,452, Cl. 156-308.600.

Imoto, Yasuo: *See*—
Sakaida, Atsuo; Chikaoka, Yasuji; Imoto, Yasuo; Iriguchi, Akira; and Ikezaki, Yoshiyuki, 4,874,978, Cl. 310-328.000.

Impris Technology Incorporated: *See*—
Vadnais, Timothy W.; and Hennenfent, Douglas J., 4,874,922, Cl. 219-243.000.
Imreg, Inc.: *See*—
Gottlieb, A. Arthur, 4,874,608, Cl. 424-85.100.
Inaba, Tsutomu: *See*—
Kobayashi, Norihide; Inaba, Tsutomu; Kimura, Tadashi; and Sugihara, Masahiro, 4,874,302, Cl. 418-55.000.
Inada, Hiromasa: *See*—
Sugimori, Teruhiko; Suzuki, Fumio; Habara, Hideaki; and Inada, Hiromasa, 4,874,841, Cl. 528-491.000.
Inagaki, Hiromichi, to Nihon Tokkyo Kanri Company Limited. Method of forming a closed filled bag, a bag construction and an apparatus for forming the bag. 4,874,257, Cl. 383-63.000.
Inatani, Toshihiro: *See*—
Hamada, Takao; Tsuchiya, Nobuo; Inatani, Toshihiro; Katayama, Eiji; Koitabashi, Toshimitsu; Okabe, Kyoji; Sumito, Mitsuo; and Takada, Yoshiyasu, 4,874,427, Cl. 75-26.000.
Ince, Gordon R., to James Howden & Company Limited. Tunnel boring machine. 4,874,267, Cl. 405-142.000.
Indiana University Foundation: *See*—
Fife, Wilmer K.; and Zhang, Zhi-Dong, 4,874,558, Cl. 562-894.000.
Indikon Company, Inc., The: *See*—
Ginns, Haskell, 4,875,007, Cl. 324-207.000.
Ing. C. Olivetti & C., S.p.A.: *See*—
Furno, Franco; and Biondi, Luigi, 4,875,035, Cl. 340-731.000.
Ink Company, The: *See*—
McKelvey, John L., 4,874,515, Cl. 210-360.100.
Inomata, Masaichi: *See*—
Uesugi, Mitsuaki; Inomata, Masaichi; and Komine, Isamu, 4,874,955, Cl. 250-550.000.
Inoue, Kiyoshi: *See*—
Fujiki, Hiroyuki; Michiura, Yoshiharu; and Inoue, Kiyoshi, 4,874,645, Cl. 428-31.000.
Inoue, Takayoshi: *See*—
Nishimoto, Yoshiro; Yoneda, Yasuji; Imaoka, Shinichi; Nakai, Yasuhide; Nakaue, Akimitsu; Onishi, Yoshihiko; Tachibana, Hiroyuki; Inoue, Takayoshi; Kusaka, Takuya; Takamatsu, Hiroyuki; Tojyo, Shigeki; Kajikawa, Hiroshi; and Nishimura, Kozo, 4,874,939, Cl. 250-211.00J.
Inoue, Yasuo, to Mitsubishi Denki Kabushiki Kaisha. Method for forming SOI film. 4,874,718, Cl. 437-62.000.
Inoue, Yukihiro: *See*—
Washizuka, Isamu; Inoue, Yukihiro; and Okajima, Yoshio, 4,875,036, Cl. 340-784.000.
Input/Output, Inc.: *See*—
Carroll, Paul E.; James, Roy W., III; Bowen, Charles K.; and Smith, Gillan C., 4,875,166, Cl. 364-421.000.
Inskip, Harold K.; and Waggoner, Marion G., to Du Pont de Nemours, E. I., and Company. Compositions of imidized acrylic polymers and polyamides. 4,874,817, Cl. 525-183.000.
Institut Francais du Petrole: *See*—
Rojey, Alexandre; and Grehier, Alain, 4,873,835, Cl. 62-93.000.
Institut Francais du Petrole & Compagnie Generale de Geophysique: *See*—
Guerendel, Philippe; Naville, Charles; Laurent, Jean; and Dedole, Pascal, 4,874,060, Cl. 181-102.000.
Institut Francais du Petrole et Geomecanique: *See*—
Le Dall, Jean-Claude; and Marchand, Jean-Claude, 4,874,328, Cl. 439-278.000.
Institut Problem Modelirovania V Energetike Akademii Nauk Ukrainskoi SSR: *See*—
Petrov, Vyacheslav V.; Gorshkov, Nikolai V.; Antonov, Alexandr A.; Tokar, Alexandr P.; Krjuchin, Andrei A.; and Shanoilo, Semen M., 4,875,204, Cl. 369-100.000.
Institute for Industrial Research and Standards: *See*—
Carroll, Francis A., 4,874,210, Cl. 312-257.100.
Institute of Molecular Biology, Inc.: *See*—
Antoniades, Harry N.; and Lynch, Samuel E., 4,874,746, Cl. 514-21.000.
Institute of Physical & Chemical Research, The: *See*—
Miya, Shinya; Harada, Masato; Mise, Takaya; and Yamazaki, Hiroshi, 4,874,880, Cl. 556-53.000.
Intel Corporation: *See*—
Jungroth, Owen W., 4,875,188, Cl. 365-185.000.
Mulder, Theodor; and Swartz, Ronald W., 4,875,191, Cl. 365-189.010.
International Business Machines Corporation: *See*—
Dickstein, Heidi L.; Hiraoka, Hiroyuki; and Lee, James H., 4,875,124, Cl. 360-126.000.
Dost, Martin H.; Hopner, Emil; Melas, Constantin M.; and Provazek, Lionel D., 4,875,112, Cl. 360-65.000.
Ferriter, Kate M.; and Mathis, Robert B., 4,875,162, Cl. 364-401.000.
Hollis Jr, Ralph L., 4,874,998, Cl. 318-568.210.
Iskiyan, James L.; Legvold, Vernon J.; Leung, Peter L. H.; and Martin, Guy E., 4,875,155, Cl. 364-200.000.
Oka, Yoshinobu; and Sato, Koichi, 4,874,931, Cl. 235-379.000.
Scott, John Campbell; and Shattuck, Meredith D., 4,874,682, Cl. 430-59.000.
International Medical Innovators, Inc.: *See*—
Nunez, Chris E., 4,874,384, Cl. 604-198.000.
International Paper Box Machine Co., Inc.: *See*—
Labombarde, Raymond A.; and Tremblay, Robert A., 4,873,813, Cl. 53-438.000.
International Telesystems Corporation: *See*—
Frimmel, James J., Jr.; Ouellette, Thomas; and Deglin, Richard N., 4,875,157, Cl. 364-200.000.
Inuzuka, Yutake: *See*—
Yamada, Ichiji; Inuzuka, Yutake; Ichihara, Isao; Murakami, Michiyuki; Suzuki, George; Yanahashi, Ryou; and Kondo, Takeshi, 4,873,884, Cl. 74-473.00P.
Ionescu, Alexandru D.: *See*—
Borcea, Nicky; and Ionescu, Alexandru D., 4,874,194, Cl. 294-88.000.
Iowa State University Research Foundation, Inc.: *See*—
Synovec, Robert E.; and Yueng, Edward S., 4,875,169, Cl. 364-497.000.
Ip, Matthew, to Halliburton Logging Services, Inc. Universal cable head for a multiconductor logging cable. 4,874,327, Cl. 439-275.000.
Iqbal, Muhammad, to Kohler Co. Diverter valve and vacuum breaker usable therewith. 4,874,006, Cl. 137-119.000.
Irace, Joseph F.: *See*—
Mendenhall, Abraham H.; Irace, Joseph F.; and Skudrzyk, Joseph, 4,874,620, Cl. 426-113.000.
Iriguchi, Akira: *See*—
Sakaida, Atsuo; Chikaoka, Yasuji; Imoto, Yasuo; Iriguchi, Akira; and Ikezaki, Yoshiyuki, 4,874,978, Cl. 310-328.000.
Isai, Masaaki: *See*—
Oshita, Masahide; Isai, Masaaki; and Fukunaka, Toshiaki, 4,874,438, Cl. 148-400.000.
Iseki Food Engineering Kabushiki Kaisha: *See*—
Sugimura, Tuyoshi; Hori, Kenji; and Oba, Kiyoyuki, 4,873,917, Cl. 99-355.000.
Ishak, Maher; and Schwartz, Alexander, to Diabrasive International Ltd. Method of forming a flexible abrasive. 4,874,478, Cl. 204-16.000.
Ishida, Toshinobu: *See*—
Kousai, Tadashi; Ishida, Toshinobu; and Moriuchi, Yousuke, 4,874,374, Cl. 604-164.000.
Ishida, Tsutomu: *See*—
Sasaki, Saburo; Ishida, Tsutomu; and Yamamoto, Kenji, 4,874,957, Cl. 250-578.000.
Ishihara, Nobuhiro: *See*—
Asano, Hiroaki; Tsujiuchi, Toshio; Yoneda, Takao; Ishihara, Nobuhiro; Maruyama, Toshio; and Ohta, Norio, 4,873,793, Cl. 51-165.710.
Ishii, Hiroaki, to Omron Tateisi Electronics Co. Electronic cash register system with faster access time to price look-up file. 4,875,163, Cl. 364-405.000.
Ishii, Masahiko: *See*—
Hamaguchi, Shigeki; Ohtsuka, Yasuhiro; Motohiro, Tomoyoshi; Taga, Yasunori; and Ishii, Masahiko, 4,874,664, Cl. 428-325.000.
Ishii, Shigeru: *See*—
Ogura, Tomoyuki; Kawamura, Yasuo; Ishii, Shigeru; Baba, Masatoshi; Taniguchi, Masakazu; Hirose, Masayoshi; Hirata, Kiminori; and Ochiai, Yoshinori, 4,874,861, Cl. 544-229.000.
Ishikawa, Kikue: *See*—
Yonemoto, Kazuya; Kagawa, Yoshiaki; Ishikawa, Kikue; Suzuki, Tomoyuki; and Hamasaki, Masaharu, 4,875,100, Cl. 358-213.190.
Ishikawa, Norio, to Mitsubishi Denki K.K. Printed circuit board. 4,874,907, Cl. 174-68.500.
Ishikawa, Toyoji; Kaneko, Toshio; Endo, Shuichi; Ogata, Yoshihiro; and Takaya, Toshihiko, to Ricoh Company, Ltd. Image developing device. 4,873,940, Cl. 118-651.000.
Ishikawajima-Harima Heavy Industries Co., Ltd.: *See*—
Watanabe, Naoto; Tanaka, Akira; Matsumoto, Takayuki; Ohmura, Yutaka; and Kojima, Hisao, 4,873,760, Cl. 29-714.000.
Ishioka, Hiroshi: *See*—
Yamamoto, Shosaku; Kakinuma, Kazuo; Ishioka, Hiroshi; Sodeyama, Fumio; Mayumi, Junji; and Maruta, Riichiro, 4,874,818, Cl. 525-183.000.
Ishizu, Hisao: *See*—
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.
Isigaki, Chizuru: *See*—
Sato, Masahiko; Konuma, Toshimitsu; Odaka, Seiichi; Yamaguchi, Toshiharu; Watanabe, Toshio; Aoyagi, Osamu; Tabata, Kaoru; Isigaki, Chizuru; Sakayori, Hiroyuki; Kobayashi, Ippei; Osabe, Akio; and Yamazaki, Shunpei, 4,874,461, Cl. 156-633.000.
Iskiyan, James L.; Legvold, Vernon J.; Leung, Peter L. H.; and Martin, Guy E., to International Business Machines Corporation. Peripheral subsystem having read/write cache with record access. 4,875,155, Cl. 364-200.000.
Isomura, Renichi: *See*—
Ito, Tomohito; Isomura, Renichi; Hirai, Hidetoshi; and Gomi, Fukuo, 4,874,495, Cl. 204-212.000.
Itabashi, Masamichi, to Fuji Photo Film Co., Ltd. Method for forming an image. 4,874,687, Cl. 430-446.000.
Itaro Horiuchi & Co., Ltd: *See*—
Kametani, Tetsuji; and Honda, Toshio, 4,874,551, Cl. 260-397.100.
Ito, Haruyuki; and Matsumoto, Akio, to Toto Ltd. Porous mold for pressure slip casting. 4,874,304, Cl. 425-84.000.
Ito, Tomohito; Isomura, Renichi; Hirai, Hidetoshi; and Gomi, Fukuo, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Apparatus for producing a fiber aggregate. 4,874,495, Cl. 204-212.000.

Ito, Toshiyasu; Minoura, Jun; Mori, Takaaki; Takahashi, Shigeyuki; Kato, Mamoru; Shimada, Junichi; and Hayakawa, Fujio, to Toyoda Gosei Co., Ltd. Planar dimmer. 4,874,229, Cl. 350-357.000.

Itoh, Kenji: *See*—
Yamazaki, Shunpei; Itoh, Kenji; and Nagayama, Susumu, 4,874,920, Cl. 219-121.850.

Itoh, Masahiro: *See*—
Matsukawa, Hideki; Masuyama, Takeshi; Hirota, Minoru; Wakahata, Yasuo; Itoh, Masahiro; and Harada, Shinji, 4,874,227, Cl. 350-334.000.

Itoh, Munehiko: *See*—
Sakamoto, Takaaki; Itoh, Munehiko; and Maeda, Shuji, 4,874,826, Cl. 525-534.000.

ITT Gilfillan, a division of ITT Corporation: *See*—
Rathi, Dev D., 4,875,050, Cl. 342-195.000.

Ivankovich, Anthony K.: *See*—
Djordjevich, Ljubomir; and Ivankovich, Anthony K., 4,873,987, Cl. 128-672.000.

Iverson, Ralph, to Whittaker Corporation. Strain relief and connector - cable assembly bearing the same. 4,874,331, Cl. 439-449.000.

Iwata, Mitsuru: *See*—
Hashimoto, Ryusuke; and Iwata, Mitsuru, 4,874,153, Cl. 264-63.000.

Izumitani, Masayoshi; and Soga, Akihiro, to Sharp Kabushiki Kaisha. Shredder. 4,873,811, Cl. 53-138.00A.

Jabs, Gert; and Richartz, Adolf, to Bayer Aktiengesellschaft. Microcapsules having polyurethane walls. 4,874,832, Cl. 528-60.000.

Jackson, Patrick; H. Continuously variable belt-drive transmission. 4,874,351, Cl. 474-49.000.

Jackson, Richard A., to Grass Valley Group, Inc., The. Perspective processing of a video signal. 4,875,097, Cl. 358-180.000.

Jacobson, Richard L.; Jeffrey, Frank R.; and Westerberg, Roger K., to Minnesota Mining and Manufacturing Company. Multi-chamber deposition system. 4,874,631, Cl. 427-39.000.

Jaeger: *See*—
Bezard, Jean-Jacques; Feppon, Philippe; and Rodionoff, Pierre, 4,874,242, Cl. 356-341.000.

Jaffe, Kenneth: *See*—
Sheridan, Michael; and Jaffe, Kenneth, 4,873,876, Cl. 73-863.860.

James Burn International Ltd.: *See*—
Jones, Leonard W. N., 4,873,858, Cl. 72-312.000.

James Howden & Company Limited: *See*—
Ince, Gordon R., 4,874,267, Cl. 405-142.000.

James L. Day Co., Inc.: *See*—
Day, James L., 4,873,873, Cl. 73-861.630.

James, Roy W., III: *See*—
Carroll, Paul E.; James, Roy W., III; Bowen, Charles K.; and Smith, Gillan C., 4,875,166, Cl. 364-421.000.

Janes, Norman F.: *See*—
Elliott, Michael; Janes, Norman F.; and Khambay, Bhupinder P. S., 4,874,781, Cl. 514-463.000.

Janney, David F. Cantilevered integral airfoil method. 4,874,031, Cl. 164-76.100.

Janssen, Adrian P., to STC PLC. Light source and detector packages. 4,874,217, Cl. 350-96.200.

Janssen, Alexander P. Disposable bags. 4,873,919, Cl. 99-403.000.

Janssen Pharmaceutica N.V.: *See*—
Ooms, Leo A. A.; and Degryse, Anne-Dominique A. Y., 4,874,766, Cl. 514-258.000.

Jarman, Thomas B., to Renishaw plc. Datuming of analogue measurement probes. 4,875,177, Cl. 364-559.000.

Jasinski, Leon: *See*—
Siwiak, Kazimierz; Jasinski, Leon; and Steel, Francis R., 4,875,038, Cl. 340-825.440.

Jaskunas, S. Richard, to Eli Lilly and Company. Expression vectors for use in *E. coli*. 4,874,703, Cl. 435-252.330.

Jeanes, Thomas O., to Dow Chemical Company, The. Gas separation membranes from bisphenol AF polycarbonates and polyestercarbonates. 4,874,401, Cl. 55-16.000.

Jeffrey, Frank R.: *See*—
Jacobson, Richard L.; Jeffrey, Frank R.; and Westerberg, Roger K., 4,874,631, Cl. 427-39.000.

Jeffs, David H.: *See*—
Jessop, Paul M.; and Jeffs, David H., 4,874,102, Cl. 215-273.000.

Jelich, Klaus; Gayer, Herbert; Kramer, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, to Bayer Aktiengesellschaft. Herbicidal agents. 4,874,424, Cl. 71-105.000.

Jenes, John A. Positive displacement engine compounded with a gas turbine engine. 4,873,825, Cl. 60-606.000.

Jeney, Josef, to Maschinenfabrik Andritz Actiengesellschaft. Process for the purification of waste gases containing hydrochloric acid and sulphur dioxide. 4,874,591, Cl. 423-240.000.

Jennings, Timothy C.: *See*—
Thompson, Marvin W.; Jennings, Timothy C.; Scott, James A.; Phenicie, Ronald W.; Murphy, Margaret H.; Nakash, Gabriel D.; Biggers, James R.; Boudreau, Lynnlee M.; and Curiel Contreras, Jorge H., 4,874,266, Cl. 403-407.100.

Jensen, Craig L.: *See*—
Sawtell, Ralph R.; Bretz, Philip E.; and Jensen, Craig L., 4,874,440, Cl. 148-437.000.

Jenson, William M.: *See*—
Grant, Robert W.; and Jenson, William M., 4,874,014, Cl. 137-606.000.

Jenusaitis, Matthew: *See*—
Sutherland, Karl M.; and Jenusaitis, Matthew, 4,874,581, Cl. 422-46.000.

Jeol Ltd.: *See*—
Ohi, Kimio, 4,874,945, Cl. 250-306.000.

Jeschke, Fred G., to American Glass and Metal Corporation. Flexible splice for metal frame members in a curtain wall. 4,873,806, Cl. 52-235.000.

Jessop, Paul M.; and Jeffs, David H., to Multi-Technology Inc. Medical fail safe releasible locks and/or seals for capped disposable centrifuge containers, cryogenic vials and the like. 4,874,102, Cl. 215-273.000.

Jidosha Kiki Co., Ltd.: *See*—
Hatanaka, Koji; Maruta, Kenzi; and Suwabe, Hirohisa, 4,874,923, Cl. 219-270.000.

Jimek International AB: *See*—
Hultberg, Sten; and Hansson, Birger, 4,873,925, Cl. 101-147.000.

Jira, Alfred: *See*—
Daubenbuchel, Werner; and Jira, Alfred, 4,874,649, Cl. 428-36.500.

Joannou, Kyriacos; Wilson, Kenneth; and Lowry, Alan B., to Pericomp Corporation. Tape head cleaner cartridge. 4,875,125, Cl. 360-128.000.

Job, Robert C., to Shell Oil Company. Silicate-modified magnesium alkoxide polymerization catalysts. 4,874,737, Cl. 502-171.000.

Jockline, S R L.: *See*—
Chiavetta, Sebastiano R.; and De Guglielmi, Giorgio, 4,874,163, Cl. 272-53.200.

Johansson, Ronald C., to Minnesota Mining and Manufacturing Company. Wiring harness. 4,874,908, Cl. 174-72.00A.

Johns Hopkins University, Med School, The: *See*—
Payne, Donna W.; and Talalay, Paul, 4,874,696, Cl. 435-26.000.

Johns, Ken; Re, Alberto; and Bargigia, Gianangelo, to Ausimont S.p.A. Process for curing thermosetting resins by means of a liquid heat transmitter. 4,874,842, Cl. 528-494.000.

Johns, Ken W. E.; Briggs, Stuart; and Flabbi, Luciano, to Montedison S.p.A. Process for carrying out the soldering of electronic components on a support. 4,874,124, Cl. 228-180.100.

Johnson, Arthur F.; and Sackett, Robert L., to RCM Industries Corporation. Economic recovery and utilization of boiler flue gas pollutants. 4,874,585, Cl. 422-171.000.

Johnson, Beamon M.: *See*—
Lauritzen, Ann M.; Baker, David S.; Christiansen, Margot H.; Johnson, Beamon M.; and Schuren, John G., 4,874,879, Cl. 549-536.000.

Johnson, Elizabeth A.: *See*—
Carethers, Mary E.; Centenko, Wiaczeslaw A.; Connor, David T.; Johnson, Elizabeth A.; Kiely, John S.; Schwender, Charles F.; Sircar, Jagadish C.; Sorenson, Roderick J.; Unangst, Paul C.; and Bruns, Robert F., 4,874,758, Cl. 514-226.500.

Johnson & Johnson Patient Care, Inc.: *See*—
Joyner, Danny W., 4,873,998, Cl. 128-879.000.

Johnson, Leonard E., Jr., to L. E. Johnson Products, Inc. Door hinge. 4,873,744, Cl. 16-247.000.

Johnson, Richard A.: *See*—
Daggett, Kenneth E.; Onaga, Eimei M.; Casler, Richard J., Jr.; and Johnson, Richard A., 4,874,997, Cl. 318-568.100.

Johnson, Robert B.; and Smith, Robert P., to K & R Equipment, Incorporated. Method and apparatus for automatically opening bags. 4,874,354, Cl. 493-101.000.

Johnson, Wayne L.: *See*—
Goodwin, Dennis L.; Hawkins, Mark R.; Johnson, Wayne L.; Olsen, Aage; and Robinson, McDonald, 4,874,464, Cl. 156-646.000.

Johnston, Lonnie E., to Crawford Fitting Company. Swaging tool having indicating means. 4,873,755, Cl. 29-237.000.

Johnston, Robert H. Power saw. 4,873,766, Cl. 30-166.100.

Joll, David J.: *See*—
Matthews, Bernard T.; Joll, David J.; and Ziauddin, Habeeb M., 4,874,623, Cl. 426-272.000.

Jones, Leonard W. N., to James Burn International Ltd. Manufacture of wire binding elements. 4,873,858, Cl. 72-312.000.

Jones, Marvin E.: *See*—
Reed, John F.; and Jones, Marvin E., 4,874,399, Cl. 55-2.000.

Jones, R. A. & Co. Inc.: *See*—
Greenwell, Joseph D., 4,874,067, Cl. 192-4.00R.

Joseph, Earl M.; Pritchard, Robert J.; and Sufi, Arshad H., to Amoco Corporation. Method of producing viscous oil from subterranean formations. 4,874,043, Cl. 166-272.000.

Joyner, Danny W., to Johnson & Johnson Patient Care, Inc. Surgical hand protector system. 4,873,998, Cl. 128-879.000.

Ju, Shiaw: *See*—
Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., 4,874,820, Cl. 525-240.000.

Jucha, Rhett B.; Carter, Duane E.; Davis, Cecil J.; and Crank, Sue E., to Texas Instruments Incorporated. Selective etching of tungsten by remote and in situ plasma generation. 4,874,723, Cl. 437-245.000.

Judge, John L., to Magni Systems, Inc. Multi-standard vectorscope. 4,875,089, Cl. 358-10.000.

Jugo-Import-Export-Anstalt: *See*—
Heinzle, Otto, 4,874,150, Cl. 249-18.000.

Julius Blum Gesellschaft M.B.H.: *See*—
Rock, Erich; and Brustle, Klaus, 4,874,212, Cl. 312-330.100.

Jung, Rolf; Buss, Albert; and Buchmann, Winfried, to Krauss u. Reichert GmbH & Co. KG Spezialmaschinenfabrik. Method for minimizing material utilization during spreading of a material web. 4,874,157, Cl. 270-30.000.

Jung, Sang H.; and Kim, Seung K., to Lucky, Ltd. Process for the preparation of pyrethroid type ester compounds. 4,874,887, Cl. 560-124.000.

Junger, Dieter: *See*—
Fehlmann, Wolfgang; Hofer, Gerald; Junger, Dieter; Karle, Anton; and Laufer, Helmut, 4,873,956, Cl. 123-357.000.

Jungroth, Owen W., to Intel Corporation. Voltage margining circuit for flash eprom. 4,875,188, Cl. 365-185.000.

Jury, Egon, to Metallgesellschaft Aktiengesellschaft. Method of and apparatus for removing gaseous pollutants from exhaust gases. 4,874,400, Cl. 55-8.000.

K & R Equipment, Incorporated: *See*—
Johnson, Robert B.; and Smith, Robert P., 4,874,354, Cl. 493-101.000.

Kabatek, Jan; and Ditl, Pavel, to Ceske vysoke uceni Technicke, rektorat. Arrangement for continuous mixing of liquids. 4,874,249, Cl. 366-339.000.

Kaburagi, Kouji: *See*—
Sonoda, Sakae; Hetsugi, Kouji; Sawasaki, Yoshihiko; Kaburagi, Kouji; and Matsushima, Yasunobu, 4,874,480, Cl. 204-56.100.

Kabushiki Kaisha Daikin Seisakusho: *See*—
Ohkubo, Masahiro, 4,873,892, Cl. 74-710.500.

Kabushiki Kaisha Horiken: *See*—
Sugimura, Tuyoshi; Hori, Kenji; and Oba, Kiyoyuki, 4,873,917, Cl. 99-355.000.

Kabushiki Kaisha Iseki Kaihatsu Koki: *See*—
Akesaka, Toshio, 4,874,268, Cl. 405-184.000.

Kabushiki Kaisha Kobe Seiko Sho: *See*—
Ichikawa, Katumi; Amano, Itaru; Hujieda, Yasuhiko; Misumi, Shikao; Hukumura, Seisuke; and Miyauchi, Hideo, 4,874,303, Cl. 425-28.100.
Nishimoto, Yoshiro; Yoneda, Yasuji; Imaoka, Shinichi; Nakai, Yasuhide; Nakaue, Akimitsu; Onishi, Yoshihiko; Tachibana, Hiroyuki; Inoue, Takayoshi; Kusaka, Takuya; Takamatsu, Hiroyuki; Tojyo, Shigeki; Kajikawa, Hiroshi; and Nishimura, Kozo, 4,874,939, Cl. 250-211.00J.

Kabushiki Kaisha Murakoshi Seiko: *See*—
Toyama, Hiroaki, 4,873,743, Cl. 16-237.000.

Kabushiki Kaisha Nippon Conlux: *See*—
Kobayashi, Osamu; Yukimoto, Koji; and Mikami, Mitsugu, 4,874,347, Cl. 453-5.000.

Kabushiki Kaisha Toshiba: *See*—
Egawa, Hidemitsu; Aoki, Riichirou; and Okumura, Katsuya, 4,875,088, Cl. 357-67.000.
Endo, Yukio; and Harada, Nozomu, 4,875,101, Cl. 358-213.190.
Hara, Toshihiro; Yotsutani, Akio; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, 4,875,231, Cl. 379-61.000.
Imamura, Makoto; and Miyamoto, Ryouichi, 4,874,086, Cl. 206-330.000.
Kato, Toshihiro; Shindo, Masamichi; and Fukasawa, Yoshihito, 4,874,956, Cl. 250-560.000.
Kurosawa, Kei, 4,874,719, Cl. 437-195.000.
Momodomi, Masaki; and Sakui, Koji, 4,875,195, Cl. 365-230.080.
Nakahara, Jirou; Ueshin, Akito; and Okajima, Shiro, 4,874,934, Cl. 235-492.000.
Nakajima, Hirotaka, 4,873,985, Cl. 128-661.090.
Okamoto, Tsuguhiko, 4,874,937, Cl. 250-203.00R.
Sakazaki, Yoshihisa, 4,875,017, Cl. 329-336.000.
Satou, Takeo; and Shimizu, Yasuhiko, 4,874,444, Cl. 156-64.000.
Yamanishi, Eiichi; Abuyama, Yasuo; and Someya, Akihiko, 4,875,092, Cl. 358-75.000.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Ito, Tomohito; Isomura, Renichi; Hirai, Hidetoshi; and Gomi, Fukuo, 4,874,495, Cl. 204-212.000.

Kabushiki Kaisha Toyota Chuo Kenkyusho: *See*—
Hamaguchi, Shigeki; Ohtsuka, Yasuhiro; Motohiro, Tomoyoshi; Taga, Yasunori; and Ishii, Masahiko, 4,874,664, Cl. 428-325.000.

Kabushiki Kaisha Yamahiro: *See*—
Kawashita, Fukunosuke, 4,874,278, Cl. 411-386.000.

Kadow, John F.: *See*—
Vyas, Dolatrai M.; Saulnier, Mark G.; and Kadow, John F., 4,874,851, Cl. 536-17.200.

Kaga, Gary: *See*—
Arnott, John; and Kaga, Gary, 4,874,099, Cl. 211-50.000.

Kagawa, Yoshiaki: *See*—
Yonemoto, Kazuya; Kagawa, Yoshiaki; Ishikawa, Kikue; Suzuki, Tomoyuki; and Hamasaki, Masaharu, 4,875,100, Cl. 358-213.190.

Kagei, Kengo: *See*—
Ueda, Kouichiro; Tanaka, Satoru; Kunii, Toshinobu; Kagei, Kengo; Sato, Tadashi; Ono, Hideki; Ohtsuka, Issei; Kawase, Mayumi; Ohgoh, Toshiharu; and Wakabayashi, Tsuneo, 4,874,869, Cl. 548-309.000.

Kaiser, Steven W.: *See*—
Olson, Kurt D.; and Kaiser, Steven W., 4,874,896, Cl. 564-479.000.

Kaiser, Thomas A.: *See*—
Binder, John J.; and Kaiser, Thomas A., 4,873,937, Cl. 118-44.000.

Kaite, Yoshikazu; and Yamagishi, Takashi, to Nippon Sheet Glass Co., Ltd. Ion exchange processing method of glass. 4,874,414, Cl. 65-20.130.

Kaito, Takashi: *See*—
Nakagawa, Yoshitomo; Kaito, Takashi; Houjyo, Hisao; and Yamamoto, Masahiro, 4,874,632, Cl. 427-41.000.

Kajigaya, Ichiro: *See*—
Hadano, Yoshikazu; Tsunoda, Eiji; and Kajigaya, Ichiro, 4,873,827, Cl. 60-646.000.

Kajikawa, Hiroshi: *See*—
Nishimoto, Yoshiro; Yoneda, Yasuji; Imaoka, Shinichi; Nakai, Yasuhide; Nakaue, Akimitsu; Onishi, Yoshihiko; Tachibana, Hiroyuki; Inoue, Takayoshi; Kusaka, Takuya; Takamatsu, Hiroyuki; Tojyo, Shigeki; Kajikawa, Hiroshi; and Nishimura, Kozo, 4,874,939, Cl. 250-211.00J.

Kajima Corporation: *See*—
Ochi, Tatsuyuki; Tanaka, Nobuo; and Mio, Kohei, 4,874,238, Cl. 356-1.000.

Kakinuma, Kazuo: *See*—
Yamamoto, Shosaku; Kakinuma, Kazuo; Ishioka, Hiroshi; Sodeyama, Fumio; Mayumi, Junji; and Maruta, Riichiro, 4,874,818, Cl. 525-183.000.

Kakuta, Toshio; and Nagano, Hiroyuki, to Hosiden Electronics Co., Ltd. Hook switch. 4,874,912, Cl. 200-16.00D.

Kamachi, Hajime: *See*—
Iimura, Seiji; Abe, Yoshio; Okumura, Jun; Naito, Takayuki; and Kamachi, Hajime, 4,874,856, Cl. 540-222.000.

Kameda, Kinya: *See*—
Kobayashi, Setsuo; Nakazawa, Tsugio; Yoshie, Yasumasa; Abiko, Yasushi; and Kameda, Kinya, 4,874,772, Cl. 514-341.000.

Kamegaya, Shigeru: *See*—
Muranaka, Shigeo; Ohkawa, Kouzaburou; Yokoyama, Junichi; Matayoshi, Yutaka; and Kamegaya, Shigeru, 4,873,953, Cl. 123-308.000.

Kametani, Tetsuji; and Honda, Toshio, to Itaro Horiuchi & Co., Ltd. δ-lactone derivatives and process of preparing same. 4,874,551, Cl. 260-397.100.

Kamifuji, Hiroshi; Tanabe, Yoshiyuki; and Morita, Kiyomi, to Hitachi, Ltd. Electronically-controlled fuel injection system for internal combustion engines. 4,873,960, Cl. 123-480.000.

Kamiya, Masaaki: *See*—
Namiki, Masayuki; Gouda, Masanori; and Kamiya, Masaaki, 4,875,011, Cl. 324-251.000.

Kamon, Kouichi, to Ricoh Company, Ltd. Document sheet position detecting device for image forming apparatus. 4,875,104, Cl. 358-400.000.

Kamon, Yoshiyuki; Ogiwara, Akira; and Nageno, Koji, to Sony Corporation. Connector apparatus. 4,874,316, Cl. 439-39.000.

Kampa, Barbara: *See*—
Yong, Bak G.; Petra, Barth; Dietrich, Demus; Detlev, Joachimi; Kampa, Barbara; Kohler, Saskia; Mohr, Kristine; Paschke, Reinhard; Pelzl, Gerhard; Rosenfeld, Ulrich; Schafer, Wolfgang; Scherf, Klaus-Dieter; Tschirske, Carsten; Weissflog, Wolfgang; and Zaschke, Horst, 4,874,544, Cl. 252-299.610.

Kan, Hirofumi: *See*—
Koishi, Musubu; Mizushima, Yoshihiko; and Kan, Hirofumi, 4,875,093, Cl. 358-83.000.

Kan, Toshiya: *See*—
Tanaka, Masato; and Kan, Toshiya, 4,874,993, Cl. 318-254.000.

Kanayama, Yutaka, to Kanayama, Yutaka; and Glory Kogyo Kabushiki Kaisha. Locomotion-command method for mobile robots. 4,875,172, Cl. 364-513.000.

Kanda, Hajime: *See*—
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.

Kaneko, Ryoichi: *See*—
Sakurai, Shigeo; Umezawa, Sadao; Usami, Saburo; Miyata, Hiroshi; Toriya, Hajime; Tsubouchi, Kuniyoshi; and Kaneko, Ryoichi, 4,875,170, Cl. 364-507.000.

Kaneko, Takaoki: *See*—
Fukuta, Kenji; Kaneko, Takaoki; and Takahashi, Yoshinobu, 4,874,453, Cl. 156-345.000.

Kaneko, Toshio: *See*—
Ishikawa, Toyoji; Kaneko, Toshio; Endo, Shuichi; Ogata, Yoshihiro; and Takaya, Toshihiko, 4,873,940, Cl. 118-651.000.

Kaneko, Yasutoshi: *See*—
Murakami, Kazuo; Kaneko, Yasutoshi; and Tamaki, Takasi, 4,873,905, Cl. 84-20.000.

Kanemitsu, Shinji: *See*—
Sootome, Sumitoshi; Mizutani, Morikazu; Ikemoto, Isao; Kanemitsu, Shinji; Kitajima, Hajime; and Onoda, Shigeyoshi, 4,875,075, Cl. 355-50.000.

Kang, Hyun S.: *See*—
Kim, Myung S.; Kang, Hyun S.; Lim, Soon K.; and Park, Hee K., 4,874,712, Cl. 437-31.000.

Kang, Sung S., to Gold Star Co., Ltd. Adjustable audio control-eraser and tape guide assembly for a cassette tape video tape recorder. 4,875,123, Cl. 360-109.000.

Kanluen, Ratana; and Licht, Brigitte H., to Hart Chemical Limited. Production of highly-dispersible water-soluble polymers. 4,874,827, Cl. 526-214.000.

Kannan, Ramamurthi, to Hilton Davis Co. Process for the production of benzenesulfonamides. 4,874,894, Cl. 564-93.000.

Kanno, Tadaaki: *See*—
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.

Kano, Shinichiro: *See*—
Yanagida, Kouichi; Kano, Shinichiro; Gotou, Takeshi; and Hirose, Takashi, 4,874,062, Cl. 181-250.000.

Kanter, John E. Soft animal toys. 4,874,344, Cl. 446-268.000.

Kanto Jidosha Kogyo Kabushiki Kaisha: *See*—
Ochisi, Hironori; Suzuki, Etsuo; and Ikuta, Kazuo, 4,874,202, Cl. 296-222.000.
Kanzaki, Hisao; and Ohba, Hisao, to Fuji Photo Film Co., Ltd. Processing apparatus. 4,875,067, Cl. 354-325.000.
Kapich, D. Davorin. Inlet guide vane assembly. 4,874,288, Cl. 415-150.000.
Kaplan, Horst; and Grube, Gerhard, to Otto Hansel GmbH. Device for transferring packages. 4,874,076, Cl. 198-370.000.
Kappeler, Franz; Wolf, Thomas; and Stegmueller, Bernhard, to Siemens Aktiengesellschaft. Laser diode array with lateral coupling. 4,875,217, Cl. 372-50.000.
Karas, Bradley R.; Foust, Donald F.; and Dumas, William V., to General Electric Company. Method for removing residual precious metal catalyst from the surface of metal-plated plastics. 4,874,635, Cl. 427-96.000.
Karg, Thomas A. Oil well pump control. 4,874,294, Cl. 417-12.000.
Karle, Anton: *See*—
Fehlmann, Wolfgang; Hofer, Gerald; Junger, Dieter; Karle, Anton; and Laufer, Helmut, 4,873,956, Cl. 123-357.000.
Karlsson, Hakan I.; Lundqvist, Inge J.; Hardin, Bengt Y.; and Ostman, Thomas L., to Svenska Traforskningsinstitutet. Method of controlling cross profile of properties of paper web. 4,874,467, Cl. 162-198.000.
Karsner, Grant G.: *See*—
Bartilucci, Mark P.; Karsner, Grant G.; and Tracy, William J., III, 4,874,505, Cl. 208-131.000.
Kasai, Isao, to Matsushita Electric Industrial Co., Ltd. A heating apparatus for automatically distinguishing the condition of food to be reheated. 4,874,928, Cl. 219-492.000.
Kasai, Tetsuji: *See*—
Minami, Syuji; Kawamoto, Keiji; Kasai, Tetsuji; Kuroiwa, Toshiaki; and Todo, Akira, 4,874,808, Cl. 524-291.000.
Kasai, Tomoaki; and Sekiguchi, Seizo, to Yoshida Kogyo K. K. Apparatus for dyeing a fabric material. 4,873,847, Cl. 68-178.000.
Kasakoshi, Toshiyuki: *See*—
Shibata, Ryoichi; and Kasakoshi, Toshiyuki, 4,874,927, Cl. 219-469.000.
Kasegawa, Norimichi, to Toyota Jidosha Kabushiki Kaisha. Control device for differential limiting mechanisms of four-wheel drive car. 4,874,059, Cl. 180-249.000.
Kasei Optonix Limited: *See*—
Hase, Takashi; and Yoshida, Hidemi, 4,874,985, Cl. 313-487.000.
Kashida, Motokazu; and Masui, Toshiyuki, to Canon Kabushiki Kaisha. Information signal transmission system by predictive differential coding. 4,875,222, Cl. 375-26.000.
Kashida, Motokazu: *See*—
Shimokoriyama, Makoto; Yamashita, Shinichi; Abe, Naoto; Kashida, Motokazu; Takei, Masahiro; and Takahashi, Koji, 4,875,090, Cl. 358-12.000.
Kashima, Kenichi: *See*—
Hisaki, Masakatu; Kashima, Kenichi; Sakamoto, Yasuhiko; Hojo, Masakazu; Katayama, Osamu; and Hata, Hiroyoshi, 4,874,773, Cl. 514-355.000.
Kashio, Jiro: *See*—
Furuhashi, Koshi; Miyazaki, Satoshi; Furuya, Masakazu; Kawatobi, Tatsuo; Kouyama, Sinichi; and Kashio, Jiro, 4,875,208, Cl. 370-94.100.
Kashiwa, Norio: *See*—
Kioka, Mamoru; and Kashiwa, Norio, 4,874,734, Cl. 502-104.000.
Kashiwada, Ken; Muto, Tadanobu; and Sasaki, Tetsuo, to Shinwa Sangyo Co., Ltd. Heat exchanger for cooling tower. 4,874,035, Cl. 165-38.000.
Kashiwada, Kunio: *See*—
Hasumoto, Toshiharu; Kashiwada, Kunio; Konishi, Minoru; and Fujishiro, Nobuo, 4,874,403, Cl. 55-55.000.
Kasica, James J.: *See*—
Eden, James L.; Kasica, James J.; and Zallie, James P., 4,874,628, Cl. 426-578.000.
Katayama, Eiji: *See*—
Hamada, Takao; Tsuchiya, Nobuo; Inatani, Toshihiro; Katayama, Eiji; Koitabashi, Toshimitsu; Okabe, Kyoji; Sumito, Mitsuo; and Takada, Yoshiyasu, 4,874,427, Cl. 75-26.000.
Katayama, Osamu: *See*—
Hisaki, Masakatu; Kashima, Kenichi; Sakamoto, Yasuhiko; Hojo, Masakazu; Katayama, Osamu; and Hata, Hiroyoshi, 4,874,773, Cl. 514-355.000.
Kato, Arthur K.: *See*—
Leonard, Vurnen; Kato, Arthur K.; Ohmori, Kiyoshi; Fujiwara, Keisuke; and Soda, Yutaka, 4,875,128, Cl. 360-133.000.
Kato, Kiyotaka; and Oshima, Michitaka, to Mitsubishi Denki Kabushiki Kaisha. Graphics input apparatus. 4,875,033, Cl. 340-706.000.
Kato, Mamoru: *See*—
Ito, Toshiyasu; Minoura, Jun; Mori, Takaaki; Takahashi, Shigeyuki; Kato, Mamoru; Shimada, Junichi; and Hayakawa, Fujio, 4,874,229, Cl. 350-357.000.
Kato, Masaaki; Uno, Tetsuya; Kobayashi, Masao; and Osuga, Naoto, to Mitsubishi Rayon Co., Ltd. Process for the production of deuterated methyl acrylate or deuterated methyl methacrylate. 4,874,890, Cl. 560-205.000.
Kato, Masanori: *See*—
Ogata, Takashi; Kato, Masanori; Kawasumi, Yoshio; Tominaga, Chikara; and Tanaka, Kanji, 4,874,436, Cl. 148-2.000.
Kato, Takeo: *See*—
Okubo, Osamu; Kato, Takeo; and Tsushima, Tetsurou, 4,874,918, Cl. 219-85.110.
Kato, Toshihiro; Shindo, Masamichi; and Fukasawa, Yoshihito, to Kabushiki Kaisha Toshiba. Method and apparatus for inspecting semiconductor devices for their bonding status. 4,874,956, Cl. 250-560.000.
Kato, Yoshiaki, to Hitachi, Ltd. Mass spectrometer. 4,874,944, Cl. 250-288.000.
Kato, Yoshihisa: *See*—
Kojima, Fumio; Tachiiri, Yoshikazu; and Kato, Yoshihisa, 4,874,174, Cl. 285-82.000.
Katsumata, Ryoichi: *See*—
Ozaki, Akio; Katsumata, Ryoichi; and Oka, Tetsuo, 4,874,698, Cl. 435-108.000.
Katz, David H., to Lidak Biopharmaceuticals. Inflammatory disease treatment. 4,874,794, Cl. 514-724.000.
Katz, Elena: *See*—
Scott, Raymond P. W.; and Katz, Elena, 4,873,862, Cl. 73-23.100.
Katz, Joseph, to California Institute of Technology. Method for generation of tunable far infrared radiation from two-dimensional plasmons. 4,874,953, Cl. 250-493.100.
Katz, Leonard; Tuan, James; and McAlpine, James B., to Abbott Laboratories. Cloning vectors for streptomyces and use thereof in macrolide antibiotic production. 4,874,748, Cl. 514-29.000.
Kauffman, Thomas F.: *See*—
Brady, Francis X.; and Kauffman, Thomas F., 4,874,804, Cl. 524-100.000.
Kausch, Erwin: *See*—
Borowski, Horst; Kausch, Erwin; Rittershaus, Erhard; Rudolph, Gert; and Schneider, Werner, 4,874,004, Cl. 131-364.000.
Kawai, Kaiji: *See*—
Kimpara, Masaomi; Kawai, Kaiji; and Tobe, Yukiya, 4,874,425, Cl. 71-121.000.
Kawai, Osamu; and Mizumura, Shunji, to Nippon Seiko Kabushiki Kaisha. Passive seat belt device. 4,874,995, Cl. 318-484.000.
Kawamata, Syooichi: *See*—
Kimura, Hiroshi; Naito, Shotaro; Miyashita, Kunio; Noto, Yasuo; Sugiura, Noboru; Takahashi, Tadashi; Yamamura, Hirohisa; Yamashita, Seizi; Kawamata, Syooichi; Tajima, Fumio; and Horikoshi, Shigeru, 4,874,053, Cl. 180-79.100.
Kawamoto, Keiji: *See*—
Minami, Syuji; Kawamoto, Keiji; Kasai, Tetsuji; Kuroiwa, Toshiaki; and Todo, Akira, 4,874,808, Cl. 524-291.000.
Kawamura, Hirotaka: *See*—
Hamasaki, Naotaka; Kawamura, Hirotaka; Ohtsu, Norio; Nakakoshi, Ichiro; Ataka, Kikuo; Oomori, Kiyosi; and Kouno, Masahiko, 4,874,882, Cl. 558-131.000.
Kawamura, Mitsuyoshi: *See*—
Narita, Yoshinori; and Kawamura, Mitsuyoshi, 4,873,952, Cl. 123-270.000.
Kawamura, Takeyoshi, to Sanki Electronic Industry Co., Ltd. Simulating staticelectricity discharges. 4,875,133, Cl. 361-230.000.
Kawamura, Yasuo: *See*—
Ogura, Tomoyuki; Kawamura, Yasuo; Ishii, Shigeru; Baba, Masatoshi; Taniguchi, Masakazu; Hirose, Masayoshi; Hirata, Kiminori; and Ochiai, Yoshinori, 4,874,861, Cl. 544-229.000.
Kawanishi, Shozo; and Higuchi, Tadashi, to Yamato Scale Company, Limited. Loading and weighing structure for combination weighing machine. 4,874,048, Cl. 177-25.180.
Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Tamba, Shinichi; and Miyake, Hitomi, 4,873,945, Cl. 123-55.00R.
Kawasaki, Ryoji: *See*—
Hara, Toshihiro; Yotsutani, Akio; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, 4,875,231, Cl. 379-61.000.
Kawasaki Steel Corporation: *See*—
Hamada, Takao; Tsuchiya, Nobuo; Inatani, Toshihiro; Katayama, Eiji; Koitabashi, Toshimitsu; Okabe, Kyoji; Sumito, Mitsuo; and Takada, Yoshiyasu, 4,874,427, Cl. 75-26.000.
Kawasaki, Tsutomu; and Kobayashi, Wataru, to Koken Co., Ltd. Apatite chromatography column system. 4,874,511, Cl. 210-198.200.
Kawase, Mayumi: *See*—
Ueda, Kouichiro; Tanaka, Satoru; Kunii, Toshinobu; Kagei, Kengo; Sato, Tadashi; Ono, Hideki; Ohtsuka, Issei; Kawase, Mayumi; Ohgoh, Toshiharu; and Wakabayashi, Tsuneo, 4,874,869, Cl. 548-309.000.
Kawashita, Fukunosuke, to Kabushiki Kaisha Yamahiro. Wood screw with chip removing portion. 4,874,278, Cl. 411-386.000.
Kawasumi, Yoshio: *See*—
Ogata, Takashi; Kato, Masanori; Kawasumi, Yoshio; Tominaga, Chikara; and Tanaka, Kanji, 4,874,436, Cl. 148-2.000.
Kawata, Ichiro: *See*—
Okamoto, Takehiko; Ohmory, Akio; Sueoka, Akinori; Kawata, Ichiro; and Akasu, Hiroyuki, 4,874,522, Cl. 210-645.000.
Kawatobi, Tatsuo: *See*—
Furuhashi, Koshi; Miyazaki, Satoshi; Furuya, Masakazu; Kawatobi, Tatsuo; Kouyama, Sinichi; and Kashio, Jiro, 4,875,208, Cl. 370-94.100.
Kay, Nathan; McNab, Donald W.; and Moya, Edward J., to Photofinish Cosmetics Inc. Manually-operated fluid dispenser and associated closure cap. 4,874,117, Cl. 222-487.000.
Kay, Peter D.; and McDonald, Keith, to Tioxide Group PLC. Emulsion paint. 4,874,806, Cl. 524-204.000.
Kaymaram, Farid, to Magnetic Peripherals Inc. Reducing harmful runout in a rigid magnetic disk through use of shims. 4,875,118, Cl. 360-99.120.
Kazama, Saburo; and Tamura, Akira, to Hitachi Ltd. Rotary head apparatus with motor magnet and yoke surrounding motor stator coil. 4,875,110, Cl. 360-64.000.

Kazmerski, Lawrence L., to United States of America, Energy. Method and apparatus for analyzing the internal chemistry and compositional variations of materials and devices. 4,874,946, Cl. 250-309.000.

Kee Equipment and Engineering: *See*—
Kee, Howard; and Goff, Frederick, 4,874,049, Cl. 177-59.000.

Kee, Howard; and Goff, Frederick, to Kee Equipment and Engineering. Automatic weighing method and apparatus. 4,874,049, Cl. 177-59.000.

Keely, Stanley L.: *See*—
Crawford, Thomas C.; Keely, Stanley L.; Larson, David L.; Lombardino, Joseph G.; and Maciejko, James J., 4,874,757, Cl. 514-226.500.

Keep, Gerald T., to Eastman Kodak Company. Reinforced polyesters, article thereof and method of making low warpage articles. 4,874,809, Cl. 524-449.000.

Keibler-Thompson Corporation: *See*—
Mancuso, Matthew A., 4,874,274, Cl. 409-300.000.

Keilhauer, Gerhard: *See*—
Brana, Miguel F.; Berlanga, Jose M. C.; Keilhauer, Gerhard; and Schlick, Erich, 4,874,863, Cl. 540-99.000.

Keiper Recaro GmbH & Company: *See*—
Walk, Hansjorg, 4,874,204, Cl. 297-362.000.

Kemter, Heinz: *See*—
Frenzel, Bertram; Grenzendorfer, Dietmar; Kemter, Heinz; Wunsch, Wolfgang; and Zeisberg, Peter, 4,873,844, Cl. 66-84.00A.

Kendall Company, The: *See*—
Doheny, Anthony J., 4,874,665, Cl. 428-345.000.

Kennedy, Christopher R.: *See*—
Kuszyk, Jack A.; and Kennedy, Christopher R., 4,874,569, Cl. 264-60.000.

Kennedy, Robert P.: *See*—
Elliott, William A.; Greene, Richard A.; Kennedy, Robert P.; Poe, Robert P., Jr.; and Steece, William H., 4,873,762, Cl. 29-809.000.

Keritsis, Gus D.: *See*—
Tamol, Ronald A.; Nepomuceno, Jose G.; Keritsis, Gus D.; Burnett, George H.; Thesing, Richard A.; Winterson, Warren D.; and Nichols, Walter A., 4,874,000, Cl. 131-375.000.

Kerr-McGee Chemical Corporation: *See*—
Owen, S. Hudson, 4,874,128, Cl. 238-355.000.
Riggs, Olen L., Jr., 4,874,434, Cl. 134-3.000.

Kersey, Alan D., to Sachs/Freeman Associates, Inc. Method and apparatus for increasing the unambiguous sensing range in an interferometric fiber gyroscope. 4,874,244, Cl. 356-350.000.

Kershaw, Jacqueline A., to Shell Oil Company. Composition containing epoxy resin and alkyl hindered polyaromatic diamine and monoaromatic amine curing agents. 4,874,833, Cl. 528-90.000.

Kesler, Gregory J.: *See*—
Schnell, Kenneth R.; and Kesler, Gregory J., 4,874,905, Cl. 174-65.00R.

Kettenring, Gunther, to Max-Planck-Gesellschaft zur Foerderung der Wissenschften e.V. Rotary transmission device for a plurality of cables between two restrictedly rotatable structures. 4,874,138, Cl. 242-54.00R.

Kewin, Daniel. Tubular core assemblies for rolls of paper or other sheet material. 4,874,139, Cl. 242-68.600.

Key, Kenneth W. Pipe joint gland reinforcing structure. 4,874,192, Cl. 285-337.000.

Khambay, Bhupinder P. S.: *See*—
Elliott, Michael; Janes, Norman F.; and Khambay, Bhupinder P. S., 4,874,781, Cl. 514-463.000.

Khatri, Hiralal N.: *See*—
Fleming, Michael P.; Schloemer, George C.; and Khatri, Hiralal N., 4,874,871, Cl. 548-543.000.
Fleming, Michael P.; Khatri, Hiralal N.; and Schloemer, George C., 4,874,872, Cl. 548-531.000.

Kidd, Richard W.: *See*—
Garg, Diwaker; Klucher, Beth A.; Dyer, Paul N.; Kidd, Richard W.; and Ceccarelli, Christopher, 4,874,642, Cl. 427-249.000.

Kido, Shigeru: *See*—
Saitoh, Izumi; Kido, Shigeru; Sasaki, Yoshio; and Shinohara, Syuichiro, 4,874,830, Cl. 526-318.400.

Kiely, John S.: *See*—
Carethers, Mary E.; Centenko, Wiaczeslaw A.; Connor, David T.; Johnson, Elizabeth A.; Kiely, John S.; Schwender, Charles F.; Sircar, Jagadish C.; Sorenson, Roderick J.; Unangst, Paul C.; and Bruns, Robert F., 4,874,758, Cl. 514-226.500.

Kiesche, Eric A.; and Crabtree, Samuel B., to Combustion Engineering, Inc. Control system for a rotation station for remotely installing a mechanical tube plug. 4,873,753, Cl. 29-157.30R.

Kihara, Taku: *See*—
Ohta, Yoshiyuki; and Kihara, Taku, 4,875,044, Cl. 341-87.000.

Kijima, Takao; and Edahiro, Takeshi, to Mazda Motor Corporation. Vehicle suspension supporting construction. 4,874,185, Cl. 280-690.000.

Kikuchi, Makoto; Mori, Shinsaku; Nikawa, Yoshio; and Terakawa, Takashige, to Tokyo Keiki Co., Ltd. Heating apparatus for hyperthermia. 4,873,995, Cl. 128-804.000.

Kim, Myung S.; Kang, Hyun S.; Lim, Soon K.; and Park, Hee K., to Samsung Semiconductor & Telecommunication Co., Ltd. Fabrication method of bipolar transistor. 4,874,712, Cl. 437-31.000.

Kim, Seung K.: *See*—
Jung, Sang H.; and Kim, Seung K., 4,874,887, Cl. 560-124.000.

Kimberly-Clark Corporation: *See*—
Cochrane, Faith E.; Smith, Michael J.; and Litvay, John D., 4,874,465, Cl. 162-111.000.

Kimizu, Ryuichi, to Omron Tateisi Electronics Co. Card authorization terminal. 4,874,932, Cl. 235-379.000.

Kimpara, Masaomi; Kawai, Kaiji; and Tobe, Yukiya, to American Cyanamid Company. Stable aqueous suspension concentrate compositions. 4,874,425, Cl. 71-121.000.

Kimura, Akinori; and Yoda, Akira, to Fuji Photo Film Co., Ltd. Method of and apparatus for developing electrophotographic film using liquid developer. 4,875,080, Cl. 355-246.000.

Kimura, Hiroshi; Naito, Shotaro; Miyashita, Kunio; Noto, Yasuo; Sugiura, Noboru; Takahashi, Tadashi; Yamamura, Hirohisa; Yamashita, Seizi; Kawamata, Syooichi; Tajima, Fumio; and Horikoshi, Shigeru, to Hitachi, Ltd. Torque detecting apparatus. 4,874,053, Cl. 180-79.100.

Kimura, Kiyoshi; Ueda, Fusao; and Tamura, Masaru, to Nippon Shinyaku Co., Ltd. 2-amino-4-nicotinoylamino-6-aryl-s-triazines as nootropic agents. 4,874,762, Cl. 514-242.000.

Kimura, Mitsuru; and Nakakita, Shoji, to NEC Corporation. Method of manufacturing a multichip package with increased adhesive strength. 4,874,721, Cl. 437-209.000.

Kimura, Tadashi: *See*—
Kobayashi, Norihide; Inaba, Tsutomu; Kimura, Tadashi; and Sugihara, Masahiro, 4,874,302, Cl. 418-55.000.

Kimura, Yasuo: *See*—
Sangyoji, Kazuo; Sakai, Jun; Hayashi, Shigeyuki; Suzuki, Makoto; and Kimura, Yasuo, 4,875,074, Cl. 355-27.000.

Kinast, Robert A.: *See*—
Andros, Andrew A.; Campana, Thomas J., Jr.; Thelen, Gary F.; and Kinast, Robert A., 4,875,039, Cl. 340-825.440.

King, Christine A.: *See*—
Newman, Alec T.; Bentley, Andrew C.; King, Christine A.; MacMahon, Alistair J.; Tansley, Robert W.; and Gibbs, Andrew R., 4,873,915, Cl. 99-289.00R.

King, David E., to C & D Engineering Company. Knurling machine and the like. 4,874,263, Cl. 72-121.000.

Kinomura, Keisuke; Kitazawa, Sadaya; Takata, Yasushi; and Sakakibara, Toshiyuki, to Nippon Fine Chemical Co., Ltd. Glycosidation catalust and process for preparing glycoside derivatives. 4,874,852, Cl. 536-18.600.

Kioka, Mamoru; and Kashiwa, Norio, to Mitsui Petrochemical Industries, Ltd. Process for producing solid catalyst for polymerization of olefins. 4,874,734, Cl. 502-104.000.

Kiorjtz Corporation: *See*—
Masuda, Isao; Fukuoka, Takashi; and Kobayashi, Fujio, 4,873,946, Cl. 123-65.0PD.
Masuda, Yoshihiko; and Murakosi, Masanobu, 4,874,437, Cl. 148-150.000.

Kipling, Kent K., to Firestone Tire & Rubber Company, The. Method for applying elastomeric material onto a drum. 4,874,443, Cl. 156-64.000.

Kiriyama, Syunichi: *See*—
Kubo, Eiichi; Nagaoka, Koichi; Miyahara, Yoshiki; Kiriyama, Syunichi; and Mishima, Yasunobu, 4,874,666, Cl. 428-398.000.

Kirkland, Joseph J.; and Kohler, Jurgen, to Du Pont de Nemours, E. I., and Company. Porous silica microspheres having a silanol enriched surface. 4,874,518, Cl. 210-502.100.

Kishishita, Ryutaro. Slot machine. 4,874,173, Cl. 273-143.00R.

Kiss, Akos; Kleinschmit, Peter; Hanich, Juergen; Halbritter, Guenter; and Horst, Jenny, to Degussa Aktiengesellschaft. Methods of preparing encapsulated pigments. 4,874,433, Cl. 106-450.000.

Kiss, Bela: *See*—
Lapis, Erzsebet; Toth, Edit; Kiss, Bela; Torley, Jozsef; Palosi, Eva; Hajdu, Istvan; Szporny, Laszlo ; Groo, Dora; and Laszlovszky, Istvan, 4,874,765, Cl. 514-255.000.

Kita, Nobuyuki: *See*—
Urabe, Yoshihiko; Higashi, Tatsuji; Takahashi, Hiroshi; and Kita, Nobuyuki, 4,874,686, Cl. 430-272.000.

Kitagawa, Tohru: *See*—
Sakai, Shunji; Kitagawa, Tohru; Suzuki, Kunikazu; and Watanabe, Naohiro, 4,875,099, Cl. 358-213.110.

Kitahira, Takashi: *See*—
Furukawa, Mitsuhiko; Kitahira, Takashi; Tanaka, Sakae; and Misumi, Kiyohito, 4,874,725, Cl. 501-89.000.

Kitajima, Hajime: *See*—
Sootome, Sumitoshi; Mizutani, Morikazu; Ikemoto, Isao; Kanemitsu, Shinji; Kitajima, Hajime; and Onoda, Shigeyoshi, 4,875,075, Cl. 355-50.000.

Kitano, Kisei: *See*—
Yoshida, Naoyuki; Kitano, Kisei; and Ogawa, Tetsuya, 4,874,546, Cl. 252-299.610.

Kitasagami, Hiroo: *See*—
Miyauchi, Akira; Nishimoto, Hiroshi; Okiyama, Tadashi; Kitasagami, Hiroo; Sugimoto, Masahiro; Tamada, Haruo; and Emori, Shinji, 4,875,087, Cl. 357-71.000.

Kitazawa, Sadaya: *See*—
Kinomura, Keisuke; Kitazawa, Sadaya; Takata, Yasushi; and Sakakibara, Toshiyuki, 4,874,852, Cl. 536-18.600.

Kitoh, Osamu; and Ohashi, Masahiko, to Toyota Jidosha Kabushiki Kaisha; and Iida Industry Co., Ltd. Thermosetting foaming sealer. 4,874,650, Cl. 428-68.000.

Kittle, Paul A., to Rusmar Incorporated. Method of providing a barrier between a substrate and the atmosphere and compositions therefor. 4,874,641, Cl. 427-244.000.

Klammer, Josef; and Grosschadl, Werner. Hot water storage tank. 4,874,104, Cl. 220-4.00B.

Klazinga, Aan H., to Shell Oil Company. Process for the preparation of modified zeolites. 4,874,729, Cl. 502-61.000.

Klazinga, Aan Hendrik, to Shell Oil Company. Process for the preparation of modified zeolites. 4,874,730, Cl. 502-61.000.

Kleeb, Thomas R.; and Wishon, Berhl E., to Dresser Industries, Inc. Lightweight fused silica refractory compositions. 4,874,726, Cl. 501-124.000.

Klein, Frank H.; Selby, Steven F.; and Klueger, Sigmund, to Chrysler Motors Corporation. Lens structure for a combined radio/audio tape cassette player or the like. 4,874,110, Cl. 220-241.000.

Kleinberg, Marvin H.: *See*—
Gotman, Alexander S., 4,874,275, Cl. 411-5.000.

Kleinschmit, Peter: *See*—
Kiss, Akos; Kleinschmit, Peter; Hanich, Juergen; Halbritter, Guenter; and Horst, Jenny, 4,874,433, Cl. 106-450.000.

Kleschick, William A.; Secor, Jacob; and Holmsen, Theodore W., to Dow Chemical Company, The. Herbicidal method with improved crop tolerance. 4,874,421, Cl. 71-9.00H.

Kline, Bruce R.: *See*—
Spillman, William B., Jr.; Rudd, Robert E., III; Ellinger, Sylvester M.; Patriquin, Douglas R.; and Kline, Bruce R., 4,874,245, Cl. 356-364.000.

Klitsner, Daniel B., to Discovery Toys, Inc. Jump chute marble race toy. 4,874,342, Cl. 446-168.000.

Klucher, Beth A.: *See*—
Garg, Diwaker; Klucher, Beth A.; Dyer, Paul N.; Kidd, Richard W.; and Ceccarelli, Christopher, 4,874,642, Cl. 427-249.000.

Klueger, Sigmund: *See*—
Klein, Frank H.; Selby, Steven F.; and Klueger, Sigmund, 4,874,110, Cl. 220-241.000.

Kluth, Joachim: *See*—
Wroblowsky, Heinz-Jurgen; Kluth, Joachim; Tietjen, Klaus-Gunther; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,874,420, Cl. 71-93.000.

KNICA Corporation: *See*—
Kobayashi, Kazuhiro; Kuramatsu, Masayuki; Koboshi, Shigeharu; Goto, Nobutaka; and Takabayashi, Naoki, 4,874,530, Cl. 210-718.000.

Knoll AG: *See*—
Brana, Miguel F.; Berlanga, Jose M. C.; Keilhauer, Gerhard; and Schlick, Erich, 4,874,863, Cl. 540-99.000.

Kobayakawa, Kouji, to Brother Kogyo Kabushiki Kaisha. Color image recording apparatus. 4,875,061, Cl. 346-157.000.

Kobayashi, Fujio: *See*—
Masuda, Isao; Fukuoka, Takashi; and Kobayashi, Fujio, 4,873,946, Cl. 123-65.0PD.

Kobayashi, Hideto; and Terauchi, Kiyoshi, to Sanden Corporation. Slant plate type compressor with variable displacement mechanism. 4,874,295, Cl. 417-222.000.

Kobayashi, Hidetoshi: *See*—
Ozawa, Takashi; and Kobayashi, Hidetoshi, 4,874,688, Cl. 430-546.000.

Kobayashi, Ippei: *See*—
Sato, Masahiko; Konuma, Toshimitsu; Odaka, Seiichi; Yamaguchi, Toshiharu; Watanabe, Toshio; Aoyagi, Osamu; Tabata, Kaoru; Isigaki, Chizuru; Sakayori, Hiroyuki; Kobayashi, Ippei; Osabe, Akio; and Yamazaki, Shunpei, 4,874,461, Cl. 156-633.000.

Kobayashi, Kazuhiro; Kuramatsu, Masayuki; Koboshi, Shigeharu; Goto, Nobutaka; and Takabayashi, Naoki, to KNICA Corporation. Method for treating photographic processing waste solution. 4,874,530, Cl. 210-718.000.

Kobayashi, Masao: *See*—
Kato, Masaaki; Uno, Tetsuya; Kobayashi, Masao; and Osuga, Naoto, 4,874,890, Cl. 560-205.000.

Kobayashi, Norihide; Inaba, Tsutomu; Kimura, Tadashi; and Sugihara, Masahiro, to Mitsubishi Denki Kabushiki Kaisha. Scroll compressor with oil feeding passages in thrust bearing. 4,874,302, Cl. 418-55.000.

Kobayashi, Osamu; Yukimoto, Koji; and Mikami, Mitsugu, to Kabushiki Kaisha Nippon Conlux. Coin separator. 4,874,347, Cl. 453-5.000.

Kobayashi, Setsuo; Nakazawa, Tsugio; Yoshie, Yasumasa; Abiko, Yasushi; and Kameda, Kinya, to Daiichi Seiyaku Co., Ltd. Antiasthmatic agent. 4,874,772, Cl. 514-341.000.

Kobayashi, Wataru: *See*—
Kawasaki, Tsutomu; and Kobayashi, Wataru, 4,874,511, Cl. 210-198.200.

Kobayashi, Yoneji: *See*—
Ezaki, Hiroshi; Kobayashi, Yoneji; and Iida, Katsumi, 4,874,171, Cl. 273-77.00A.

Koboshi, Shigeharu: *See*—
Kobayashi, Kazuhiro; Kuramatsu, Masayuki; Koboshi, Shigeharu; Goto, Nobutaka; and Takabayashi, Naoki, 4,874,530, Cl. 210-718.000.

Kodo, Toshikazu; and Tanaka, Shinichi, to Matsushita Electric Industrial Co., Ltd. Disk-type storage medium recording/reproducing apparatus. 4,875,202, Cl. 369-32.000.

Koester, Klaus: *See*—
Richtler, Hans-Joachim; Kreutzer, Udo; Carduck, Franz-Josef; Koester, Klaus; and Harth, Hubert, 4,874,552, Cl. 260-400.000.

Koga, Tomio: *See*—
Ushimaru, Koichi; Hamakawa, Tomoaki; and Koga, Tomio, 4,874,774, Cl. 514-356.000.

Kogi, Kentaro: *See*—
Yamada, Shin-ichi; Goto, Takao; Mashiko, Toshihisa; Kogi, Kentaro; Oguchi, Yukiko; and Narita, Senichi, 4,874,760, Cl. 514-234.200.

Kohlensaeurewerk Deutschland GmbH: *See*—
Gruenhoff, Ulrich; and Schneider, Bernhard, 4,874,615, Cl. 426-15.000.

Kohler Co.: *See*—
Iqbal, Muhammad, 4,874,006, Cl. 137-119.000.

Kohler General Corporation: *See*—
Rosenthal, Bruce C., 4,874,996, Cl. 318-567.000.

Kohler, Jurgen: *See*—
Kirkland, Joseph J.; and Kohler, Jurgen, 4,874,518, Cl. 210-502.100.

Kohler, Saskia: *See*—
Yong, Bak G.; Petra, Barth; Dietrich, Demus; Detlev, Joachimi; Kampa, Barbara; Kohler, Saskia; Mohr, Kristine; Paschke, Reinhard; Pelzl, Gerhard; Rosenfeld, Ulrich; Schafer, Wolfgang; Scherf, Klaus-Dieter; Tachirske, Carsten; Weissflog, Wolfgang; and Zaschke, Horst, 4,874,544, Cl. 252-299.610.

Kohler, Tilo, to Miller, Richard L. Dry cleaning equipment utilizing perchlorethylene recovery process. 4,874,472, Cl. 202-169.000.

Kohno, Hideki: *See*—
Murakami, Yoshiki; Yamamoto, Etsuji; Yabusaki, Masao; and Kohno, Hideki, 4,875,013, Cl. 324-318.000.

Koike, Naomasa: *See*—
Hiraishi, Shigetoshi; Koike, Naomasa; Kondo, Kazuyoshi; and Fuchigami, Mitsuru, 4,874,740, Cl. 503-201.000.

Koike, Toshifumi: *See*—
Tokisue, Hiromitsu; Tsumaki, Nobuo; and Koike, Toshifumi, 4,874,273, Cl. 406-88.000.

Koishi, Musubu; Mizushima, Yoshihiko; and Kan, Hirofumi, to Hamamatsu Photonics Kabushiki Kaisha. Ultrafast continuous imaging apparatus. 4,875,093, Cl. 358-83.000.

Koitabashi, Toshimitsu: *See*—
Hamada, Takao; Tsuchiya, Nobuo; Inatani, Toshihiro; Katayama, Eiji; Koitabashi, Toshimitsu; Okabe, Kyoji; Sumito, Mitsuo; and Takada, Yoshiyasu, 4,874,427, Cl. 75-26.000.

Koito Seisakusho Co., Ltd.: *See*—
Miyauchi, Shizuya; and Wada, Kiyoshi, 4,875,141, Cl. 362-61.000.

Koizumi, Hideaki: *See*—
Maeda, Akira; Sano, Koichi; Yokoyama, Tetsuo; Koizumi, Hideaki; and Mizuno, Hirotaka, 4,875,012, Cl. 324-309.000.

Kojima, Akio: *See*—
Suzuki, Tetsuro; Yoshikawa, Masao; and Kojima, Akio, 4,874,481, Cl. 204-59.00R.

Kojima, Fumio; Tachiiri, Yoshikazu; and Kato, Yoshihisa, to Aisin Seiki Kabushiki Kaisha; and Toyota Jidosha Kabushiki Kaisha. Tube connecting unit. 4,874,174, Cl. 285-82.000.

Kojima, Hisao: *See*—
Watanabe, Naoto; Tanaka, Akira; Matsumoto, Takayuki; Ohmura, Yutaka; and Kojima, Hisao, 4,873,760, Cl. 29-714.000.

Kojima Press Industry Co., Ltd.: *See*—
Yanagida, Kouichi; Kano, Shinichiro; Gotou, Takeshi; and Hirose, Takashi, 4,874,062, Cl. 181-250.000.

Koken Co., Ltd.: *See*—
Kawasaki, Tsutomu; and Kobayashi, Wataru, 4,874,511, Cl. 210-198.200.

Kokholm, Finn: *See*—
Christiansen, Torben F.; and Kokholm, Finn, 4,874,501, Cl. 204-415.000.

Kokusai Denshin Denwa Kabushiki Kaisha: *See*—
Matsumoto, Shuichi; and Murakami, Hitomi, 4,875,095, Cl. 358-133.000.
Utaka, Katsuyuki; Sakai, Kazuo; Matsushima, Yuichi; and Akiba, Shigeyuki, 4,874,216, Cl. 350-96.190.

Kolbig, Kunigunde: *See*—
Eck, Herbert; Fleischmann, Gerald; Prasse, Alfred; and Kolbig, Kunigunde, 4,874,638, Cl. 427-222.000.

Koleske, Joseph V.; and Kwiatkowski, George T., to Union Carbide Corporation. Photocopolymerizable compositions based on epoxy and hydroxyl-containing organic materials and substituted cycloaliphatic monoepoxide reactive diluents. 4,874,798, Cl. 522-31.000.

Komatsu, Kazunori; Chikamasa, Hiroshi; and Sato, Tsunehiko, to Fuji Photo Film Co., Ltd. Method of producing magnetic recording medium. 4,874,633, Cl. 427-48.000.

Komine, Isamu: *See*—
Uesugi, Mitsuaki; Inomata, Masaichi; and Komine, Isamu, 4,874,955, Cl. 250-550.000.

Komori Printing Machinery Co., Ltd.: *See*—
Watanabe, Hideo; and Kurata, Yoshiaki, 4,874,247, Cl. 356-402.000.

Kondo, Kazuyoshi: *See*—
Hiraishi, Shigetoshi; Koike, Naomasa; Kondo, Kazuyoshi; and Fuchigami, Mitsuru, 4,874,740, Cl. 503-201.000.

Kondo, Kenshi, to Nihon Den-Netsu Keiki Co., Ltd. Device for transferring printed circuit board. 4,874,081, Cl. 198-803.900.

Kondo, Kuniharu, to NGK Insulators, Ltd. A ceramic filter for semi-ultrafiltration. 4,874,516, Cl. 210-490.000.

Kondo, Takeshi: *See*—
Yamada, Ichiji; Inuzuka, Yutake; Ichihara, Isao; Murakami, Michiyuki; Suzuki, George; Yanahashi, Ryou; and Kondo, Takeshi, 4,873,884, Cl. 74-473.00P.

Kondo, Tetsuya, to Sony Corporation. Current generating circuit. 4,874,964, Cl. 307-270.000.

Konishi, Minoru: *See*—
Hasumoto, Toshiharu; Kashiwada, Kunio; Konishi, Minoru; and Fujishiro, Nobuo, 4,874,403, Cl. 55-55.000.

Konishiroku Photo Industry Co., Ltd.: *See*—
Shirai, Miyuki; and Nogami, Akira, 4,874,683, Cl. 430-114.000.

Konoplyanko, Anatoly I.: *See*—
Dzjuban, Vitaly S.; Sazhin, Alexandr D.; Zhitnikov, Valery K.; and Konoplyanko, Anatoly I., 4,875,040, Cl. 340-825.060.

Konsepts Beauty Supply, Inc.: *See*—
Ferraris, Lori, 4,874,001, Cl. 132-75.800.

Konuma, Toshimitsu: *See*—
Sato, Masahiko; Konuma, Toshimitsu; Odaka, Seiichi; Yamaguchi, Toshiharu; Watanabe, Toshio; Aoyagi, Osamu; Tabata, Kaoru; Isigaki, Chizuru; Sakayori, Hiroyuki; Kobayashi, Ippei; Osabe, Akio; and Yamazaki, Shunpei, 4,874,461, Cl. 156-633.000.

Korf Engineering GmbH: *See*—
Papst, Gero; and Nagl, Michael, 4,874,037, Cl. 165-47.000.

Korsunsky, Iosif; Foreman, Gerald L.; and Bateman, Steven P., to AMP Incorporated. Insertion/extraction tool. 4,873,761, Cl. 29-741.000.

Koshiba, Nobuharu; Ikehata, Toshihiko; and Takata, Kenichi, to Matsushita Electric Industrial Co., Ltd. Lithium secondary battery. 4,874,680, Cl. 429-197.000.

Kosikowski, Thomas: *See*—
Haase, Peter; Kosikowski, Thomas; and Steger, Horst, 4,874,479, Cl. 204-27.000.

Kosinski, Frederick: *See*—
Arefinejad, Majid; Brothers, Dennis J.; and Kosinski, Frederick, 4,874,205, Cl. 297-379.000.

Koster, Marinus P.; Bouwens, Henricus J. J.; Van Tartwijk, Anton A. J.; and De Peuter, Willem L. G., to U.S. Philips Corporation. Manipulator with rod mechanism. 4,874,286, Cl. 414-744.500.

Kotani, Shou: *See*—
Yamamoto, Shinobu; Hoshide, Fumitoshi; Takeuchi, Michikazu; Kotani, Shou; and Yasuda, Sumihiro, 4,874,924, Cl. 219-274.000.

Kotlyar, Oleg: *See*—
Brimhall, Owen D.; Peterson, Stephen C.; Kotlyar, Oleg; and Ghosh Roy, Dilip N., 4,874,358, Cl. 494-37.000.

Kouno, Masahiko: *See*—
Hamasaki, Naotaka; Kawamura, Hirotaka; Ohtsu, Norio; Nakakoshi, Ichiro; Ataka, Kikuo; Oomori, Kiyosi; and Kouno, Masahiko, 4,874,882, Cl. 558-131.000.

Koupal, Lawrence: *See*—
Huang, Leeyuan; Koupal, Lawrence; Dunn, Joseph, Jr.; Liesch, Jerrold M.; Hensens, Otto; and Woodruff, H. Boyd, 4,874,745, Cl. 514-18.000.

Kousai, Tadashi; Ishida, Toshinobu; and Moriuchi, Yousuke, to Terumo Kabushiki Kaisha. Medical tool introduction cannula and method of manufacturing the same. 4,874,374, Cl. 604-164.000.

Kouyama, Sinichi: *See*—
Furuhashi, Koshi; Miyazaki, Satoshi; Furuya, Masakazu; Kawatobi, Tatsuo; Kouyama, Sinichi; and Kashio, Jiro, 4,875,208, Cl. 370-94.100.

Koya, Kazuo: *See*—
Yokokawa, Kiyoshi; and Koya, Kazuo, 4,874,416, Cl. 65-3.120.

Koyo Disposable Goods Company: *See*—
Takagi, Katsumasa, 4,874,456, Cl. 156-471.000.

Koze, Jeffrey T.; and Miller, Anton J., to AT&T Bell Laboratories. Integrated circuits from wafers having improved flatness. 4,874,463, Cl. 156-645.000.

Kramer, Charles E.: *See*—
Davis, Robert B.; Kramer, Charles E.; and Barlow, Sandra K., 4,874,660, Cl. 428-234.000.

Kramer, Wolfgang: *See*—
Jelich, Klaus; Gayer, Herbert; Kramer, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,874,424, Cl. 71-105.000.

Kranz, David M.: *See*—
Saito, Haruo; Kranz, David M.; Eisen, Herman N.; and Tonegawa, Susumu, 4,874,845, Cl. 530-395.000.

Krapez, Jean-Claude: *See*—
Cielo, Paolo; Krapez, Jean-Claude; Cole, Kenneth C.; and Vaudreuil, Ghislain, 4,874,948, Cl. 250-341.000.

Kratzer, Dean J.: *See*—
Henley, Francois G.; Choi, Hee-June; Kratzer, Dean J.; and Barr, Maurice R., 4,875,006, Cl. 324-158.00R.

Krauss u. Reichert GmbH & Co. KG Spezialmaschinenfabrik: *See*—
Jung, Rolf; Buss, Albert; and Buchmann, Winfried, 4,874,157, Cl. 270-30.000.

Kregness, Glen R.; and Quinton, Walter L., to Unisys Corporation. Multi-function scaler for normalization of numbers. 4,875,180, Cl. 364-715.030.

Krenn, Karl D.: *See*—
Fischer, Wolfgang; and Krenn, Karl D., 4,874,709, Cl. 436-42.000.

Krepski, Larry R.: *See*—
Rasmussen, Jerald K.; Heilmann, Steven M.; Krepski, Larry R.; and Moren, Dean M., 4,874,822, Cl. 525-279.000.

Kreutzer, Udo: *See*—
Richtler, Hans-Joachim; Kreutzer, Udo; Carduck, Franz-Josef; Koester, Klaus; and Harth, Hubert, 4,874,552, Cl. 260-400.000.

Kriech, Anthony J.; and Wissel, Herbert L., to Asphalt Materials, Inc. Multigrade asphalt cement product and process. 4,874,432, Cl. 106-273.100.

Krieg, Adrian H. Railroad rail cold saw. 4,873,902, Cl. 83-745.000.

Krishnan, Sivaram: *See*—
Lundy, Charles E.; Krishnan, Sivaram; and Reinert, Gerard E., 4,874,802, Cl. 524-94.000.

Krjuchin, Andrei A.: *See*—
Petrov, Vyacheslav V.; Gorshkov, Nikolai V.; Antonov, Alexandr A.; Tokar, Alexandr P.; Krjuchin, Andrei A.; and Shanoilo, Semen M., 4,875,204, Cl. 369-100.000.

Krueger, Hans; and Welsch, Wolfgang, to Siemens Aktiengesellschaft. Laser tube for polarized laser emission. 4,875,220, Cl. 372-107.000.

Krumkalns, Eriks V.; and Smiley, David L., to Eli Lilly and Company. Agriculturally useful sulfonamides. 4,874,775, Cl. 514-357.000.

Krupp Kautex Maschinenbau GmbH.: *See*—
Daubenbuchel, Werner; and Jira, Alfred, 4,874,649, Cl. 428-36.500.

Kruse, Alfred; Siegemund, Gunter; and Schwertfeger, Werner, to Hoechst Aktiengesellschaft. Process for the preparation of perfluorinated carbonyl fluorides. 4,874,557, Cl. 562-851.000.

Kruse, Cornelis: *See*—
Van Wijngaarden, Ineke; Kruse, Cornelis; Van Der Heyden, Johannes A. M.; and Tulp, Martinus T. M., 4,874,770, Cl. 514-326.000.

Ku, Thomas W.: *See*—
Gleason, John G.; Hall, Ralph F.; Ku, Thomas W.; and Perchonock, Carl D., 4,874,792, Cl. 514-570.000.

Kuau Technology, Ltd.: *See*—
Decker, John A., Jr.; Decker, Linda M.; and Halford, Christopher J., 4,873,907, Cl. 84-291.000.

Kubo, Eiichi; Nagaoka, Koichi; Miyahara, Yoshiki; Kiriyama, Syunichi; and Mishima, Yasunobu, to Unitika Ltd. Polyolefinic biconstituent fiber and nonwove fabric produced therefrom. 4,874,666, Cl. 428-398.000.

Kubo, Hiroyoshi: *See*—
Takahashi, Kazuo; and Kubo, Hiroyoshi, 4,874,954, Cl. 250-548.000.

Kubodera, Takayuki; Nakamura, Shizuo; Onizawa, Masanori; Shiroshita, Hirotaka; Mochizuki, Eiichi; Tsujimura, Masao; Atsuta, Toshikatsu; and Morooka, Takayoshi, to Kyocera Corporation. Camera. 4,875,065, Cl. 354-82.000.

Kubota Ltd.: *See*—
Yamada, Kiichiro, 4,873,944, Cl. 123-41.570.

Kuenzly, John D.: *See*—
Egense, Andrea L. F.; and Kuenzly, John D., 4,873,930, Cl. 110-345.000.

Kuhn, Irene: *See*—
Andrews, William H.; Brothers, Virginia M.; Files, James G.; Kuhn, Irene; McCaman, Michael T.; Paul, Leland S.; Sias, Stacey R.; Gore, Thomas C.; Newman, Karel Z., Jr.; and Tedesco, John L., 4,874,705, Cl. 435-252.330.

Kuisma, Heikki, to Vaisala Oy. Pressure sensor construction and method for its fabrication. 4,875,134, Cl. 361-282.000.

Kukke, Gopal S., to Pioneer Industries, Division of Core Industries, Inc. Drywall frame compression anchor assembly and frame. 4,873,804, Cl. 52-217.000.

Kule, Engelbert; and Adler, Alfons, to Bayer Aktiengesellschaft. Preparation of 3-sulphenylmaleimides. 4,874,874, Cl. 548-544.000.

Kulle, Lee; Desecki, Vince; and Hess, John M, III, to Baxter International Inc. Self-priming injection site with check valve. 4,874,369, Cl. 604-86.000.

Kuna, Wayne A., to Marvin Glass & Associates. Skill action game with a tiltable housing and an alarm producing disturbance sensor. 4,874,166, Cl. 273-1.0GC.

Kunihiro, Koki: *See*—
Funaki, Masaaki; Kunihiro, Koki; and Ichinomiya, Yutaka, 4,874,654, Cl. 428-192.000.

Kunii, Toshinobu: *See*—
Ueda, Kouichiro; Tanaka, Satoru; Kunii, Toshinobu; Kagei, Kengo; Sato, Tadashi; Ono, Hideki; Ohtsuka, Issei; Kawase, Mayumi; Ohgoh, Toshiharu; and Wakabayashi, Tsuneo, 4,874,869, Cl. 548-309.000.

Kuo, Pao-Kuang: *See*—
Thomas, Robert L.; Kuo, Pao-Kuang; and Favro, Lawrence D., 4,874,251, Cl. 374-45.000.

Kuphal, Jeffrey A.; Robeson, Lloyd M.; and Weber, James J., to Air Products and Chemicals, Inc. Blends of poly(propylene carbonate) and poly(methyl methacrylate) and their use in decomposition molding. 4,874,030, Cl. 164-34.000.

Kuraray Co., Ltd.: *See*—
Okamoto, Takehiko; Ohmory, Akio; Sueoka, Akinori; Kawata, Ichiro; and Akasu, Hiroyuki, 4,874,522, Cl. 210-645.000.

Kurata, Yoshiaki: *See*—
Watanabe, Hideo; and Kurata, Yoshiaki, 4,874,247, Cl. 356-402.000.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,874,750, Cl. 514-42.000.

Kurematsu, Masayuki: *See*—
Kobayashi, Kazuhiro; Kurematsu, Masayuki; Koboshi, Shigeharu; Goto, Nobutaka; and Takabayashi, Naoki, 4,874,530, Cl. 210-718.000.

Kurihara, Kazumasa: *See*—
Akira, Mizusawa; and Kurihara, Kazumasa, 4,874,510, Cl. 210-172.000.

Kuroiwa, Toshiaki: *See*—
Minami, Syuji; Kawamoto, Keiji; Kasai, Tetsuji; Kuroiwa, Toshiaki; and Todo, Akira, 4,874,808, Cl. 524-291.000.

Kurosaki, Makoto, to Yamaha Corporation. Drum foot pedal apparatus. 4,873,910, Cl. 84-422.100.

Kurosawa, Kei, to Kabushiki Kaisha Toshiba. Method for manufacturing an electrical connection between conductor levels. 4,874,719, Cl. 437-195.000.

Kurr, Klaus: *See*—
Andra, Rainer; Kurr, Klaus; Ullrich, Gunter; and Dorge, Udo, 4,873,887, Cl. 74-573.00F.

Kusaka, Takuya: *See*—
Nishimoto, Yoshiro; Yoneda, Yasuji; Imaoka, Shinichi; Nakai, Yasuhide; Nakaue, Akimitsu; Onishi, Yoshihiko; Tachibana, Hiroyuki; Inoue, Takayoshi; Kusaka, Takuya; Takamatsu,

Hiroyuki; Tojyo, Shigeki; Kajikawa, Hiroshi; and Nishimura, Kozo, 4,874,939, Cl. 250-211.00J.

Kusan, Inc.: *See*—
Lo, Ying-Cheng; and Humphries, Darral V., 4,874,657, Cl. 428-220.000.

Kushibe, Yuki; and Sato, Hiroshi, to Mitsubishi Jukogyo Kabushiki Kaisha. Die clamping apparatus. 4,874,309, Cl. 425-589.000.

Kussel, Willy; and Frank, Reiner, to Gewerkschaft Eisenhutte Westfalia GmbH. Cable assembly for mineral mining installations. 4,874,335, Cl. 439-589.000.

Kuster, Hans-Werner; Radermacher, Herbert; and Vanaschen, Luc, to Saint-Gobain Vitrage "Les Miroirs" . Blow box for glass tempering. 4,874,418, Cl. 65-348.000.

Kuszyk, Jack A.; and Kennedy, Christopher R., to Lanxide Technology Company, LP. Ceramic composite and methods of making the same. 4,874,569, Cl. 264-60.000.

Kuwabara, Takao; and Takahashi, Kazuo, to Hitachi, Ltd. Automatic control system. 4,874,999, Cl. 318-610.000.

Kuwahara, Ikuro: *See*—
Wakabayashi, Ataru; Umehara, Yohichi; Morie, Satsuki; Kuwahara, Ikuro; and Okada, Yoshimi, 4,874,483, Cl. 204-94.000.

Kuwano, Yukinori: *See*—
Tsujino, Yoshikazu; Hamada, Yuuji; Sakata, Masakazu; Fujii, Takanori; and Kuwano, Yukinori, 4,874,646, Cl. 428-34.100.

KWC AG: *See*—
Blattler, Ernst, 4,873,830, Cl. 62-3.300.

Kwiatkowski, George T.: *See*—
Koleske, Joseph V.; and Kwiatkowski, George T., 4,874,798, Cl. 522-31.000.

Kwok, Hoi-Sing: *See*—
Shaw, David T.; Witanachchi, Sarath; and Kwok, Hoi-Sing, 4,874,741, Cl. 505-1.000.

Kwoka, Georg, to Viscodrive GmbH. Viscous shear coupling. 4,874,058, Cl. 180-248.000.

Kyocera Corporation: *See*—
Kubodera, Takayuki; Nakamura, Shizuo; Onizawa, Masanori; Shiroshita, Hirotaka; Mochizuki, Eiichi; Tsujimura, Masao; Atsuta, Toshikatsu; and Morooka, Takayoshi, 4,875,065, Cl. 354-82.000.

Kyodo Oxygen Co., Ltd.: *See*—
Shino, Masami; Takano, Hideaki; Nakata, Jitsuo; and Noro, Katsuhiko, 4,874,592, Cl. 423-262.000.

Kyoo, Takatsugu: *See*—
Yaguchi, Akio; and Kyoo, Takatsugu, 4,874,077, Cl. 198-408.000.

Kyowa Hakko Kogyo Co., Ltd.: *See*—
Ozaki, Akio; Katsumata, Ryoichi; and Oka, Tetsuo, 4,874,698, Cl. 435-108.000.

L.E.A. Dynatech: *See*—
Rozanski, Robert D.; Medlock, James R., III; and Larson, Stephen F., 4,875,137, Cl. 361-331.000.

L. E. Johnson Products, Inc.: *See*—
Johnson, Leonard E., Jr., 4,873,744, Cl. 16-247.000.

La-Man Corporation: *See*—
Overby, Kenneth W., 4,874,408, Cl. 55-218.000.

Labombarde, Raymond A.; and Tremblay, Robert A., to International Paper Box Machine Co., Inc. Method of packaging box flats. 4,873,813, Cl. 53-438.000.

Laboratoires Flork S.A. Zone Industrielle Du Brezet: *See*—
Flork, Michel, 4,874,893, Cl. 562-443.000.

Lacey, Christopher A.: *See*—
Favrou, John M.; Lacey, Christopher A.; and Brock, George W., 4,875,129, Cl. 360-122.000.

Lafever, Alan W., to Universal Plastics Incorporated, a part interest. Shoe sole with retractable cleats. 4,873,774, Cl. 36-61.000.

Lafreniere, Dennis R.; and McConnell, Ronald E., to LaFreniere, Dennis R. Handling device for coins, tokens and the like. 4,874,348, Cl. 453-50.000.

LaFreniere, Dennis R.: *See*—
Lafreniere, Dennis R.; and McConnell, Ronald E., 4,874,348, Cl. 453-50.000.

LaFreniere, Lucie Y., to Exxon Research and Engineering Company. Method for reducing the cloud point of materials using an ultrafiltration separation process. 4,874,523, Cl. 210-651.000.

Lahti, Archie E., to Unisys Corporation. Scientific processor vector file organization. 4,875,161, Cl. 364-200.000.

Lai, Shun T. Trap. 4,873,785, Cl. 43-61.000.

Laing, Johannes L. N.: *See*—
Laing, Oliver; and Laing, Johannes L. N., 4,873,828, Cl. 60-659.000.

Laing, Johannes N.: *See*—
Laing, Karsten A.; Ludin, Ludwig; and Laing, Johannes N., 4,874,300, Cl. 411-420.000.

Laing, Karsten A.; Ludin, Ludwig; and Laing, Johannes N. Ceramic step bearing in a centrifugal pump. 4,874,300, Cl. 411-420.000.

Laing, Oliver; and Laing, Johannes L. N. Energy storage for off peak electricity. 4,873,828, Cl. 60-659.000.

Lainiere de Picardie: *See*—
Groshens, Pierre, 4,874,655, Cl. 428-198.000.

L'Air Liquide, Societe Anonyme Pour L'Etude et L'Exploitation des Procedes Georges Claude: *See*—
Thonnelier, Jean-Yves, 4,874,413, Cl. 62-23.000.

Lamaire, Jacques: *See*—
Arnaud, Rene; Gardette, Jean-Luc; and Lamaire, Jacques, 4,874,952, Cl. 250-455.100.

Lancette, Henry J. Device for retaining a fish line against a tapered fishing rod. 4,873,780, Cl. 43-25.200.

Landgraf, Hermann: *See*—
Fleer, Ernst O.; Landgraf, Hermann; and Schwarz, Werner, 4,874,314, Cl. 433-129.000.

Lang, Hans-Jorg: *See*—
Schwerdtel, Ernst; and Lang, Hans-Jorg, 4,874,022, Cl. 141-165.000.

Lange, Fritz; Busch, Peter; and Thiele, Klaus, to Henkel Kommanditgesellschaft auf Aktien. Quaternary ammonium compounds. 4,874,554, Cl. 260-404.000.

Lanxide Technology Company, LP: *See*—
Kuszyk, Jack A.; and Kennedy, Christopher R., 4,874,569, Cl. 264-60.000.

Lapatovich, Walter P.: *See*—
Sigai, A. Gary; Lapatovich, Walter P.; and Alexander, Michael N., 4,874,984, Cl. 313-486.000.

Lapis, Erzsebet; Toth, Edit; Kiss, Bela; Torley, Jozsef; Palosi, Eva; Hajdu, Istvan; Szporny, Laszlo ; Groo, Dora; and Laszlovszky, Istvan, to Richter Gedeon Vegyeszeti Gyar. 1,4-Disubstituted piperazines having dopaminergic activity. 4,874,765, Cl. 514-255.000.

Lara, Francisco J., to Ferrero & Wepfer, a part interest. X-R case. 4,874,092, Cl. 206-492.000.

Larsen, Rolf O.: *See*—
Borretzen, Bernt; Larsen, Rolf O.; Pettersen, Erik O.; Dornish, John M.; and Oftebro, Rolf, 4,874,780, Cl. 514-452.000.

Larson, David L.: *See*—
Crawford, Thomas C.; Keely, Stanley L.; Larson, David L.; Lombardino, Joseph G.; and Maciejko, James J., 4,874,757, Cl. 514-226.500.

Larson, Paul A.; Aldrich, Dale J.; and Berman, Jody R., to Dow Chemical Company, The. Curable compositions containing an epoxy resin, a difunctional phenol and a polyfunctional phenol. 4,874,669, Cl. 428-416.000.

Larson, Stephen F.: *See*—
Rozanski, Robert D.; Medlock, James R., III; and Larson, Stephen F., 4,875,137, Cl. 361-331.000.

Laszlovszky, Istvan: *See*—
Lapis, Erzsebet; Toth, Edit; Kiss, Bela; Torley, Jozsef; Palosi, Eva; Hajdu, Istvan; Szporny, Laszlo ; Groo, Dora; and Laszlovszky, Istvan, 4,874,765, Cl. 514-255.000.

Laterza, Joseph. Plant spinner. 4,873,790, Cl. 47-67.000.

Latta, Loren L.: *See*—
Finnieston, Alan; Burkhalter, William E.; Reyes, Franklin; and Latta, Loren L., 4,873,968, Cl. 128-87.00R.

Lau, Frederick L., to Switchcraft, Inc. Jackfield with front terminals. 4,874,317, Cl. 439-54.000.

Lau, Kreisler S. Y.: *See*—
Oldham, Susan L.; Elias, William E.; Bigus, Stephen J.; and Lau, Kreisler S. Y., 4,874,643, Cl. 427-340.000.

Laudy, Roger: *See*—
Talalay, Anselm; and Borsvold, Herbert H., 4,874,454, Cl. 156-359.000.

Laufer, Helmut: *See*—
Fehlmann, Wolfgang; Hofer, Gerald; Junger, Dieter; Karle, Anton; and Laufer, Helmut, 4,873,956, Cl. 123-357.000.

Laurent, Jean: *See*—
Guerendel, Philippe; Naville, Charles; Laurent, Jean; and Dedole, Pascal, 4,874,060, Cl. 181-102.000.

Lauritzen, Ann M.; Baker, David S.; Christiansen, Margot H.; Johnson, Beamon M.; and Schuren, John G., to Shell Oil Company. Process for starting-up an ethylene oxide reactor. 4,874,879, Cl. 549-536.000.

Lavoie, Patrick J., to Gas Tank Renu - USA. Method for repairing fuel tanks. 4,874,445, Cl. 156-64.000.

Law, David J. C.; and Panesar, Lukhbir S., to Lucas Industries Public Limited Company. Fuel injection pumping apparatus. 4,873,959, Cl. 123-458.000.

Lawson, John E., to Cameron Iron Works U.S.A., Inc. Valve mounting and block manifold. 4,874,008, Cl. 137-315.000.

Lawson, R. Joe: *See*—
Sachtler, J. W. Adriaan; and Lawson, R. Joe, 4,874,731, Cl. 502-66.000.

Leach, Dennis: *See*—
Freed, Herbert D.; and Leach, Dennis, 4,874,320, Cl. 439-115.000.

Leben, David G. Container and method for carrying and transporting computer tape cartridges. 4,874,088, Cl. 206-387.000.

LeBlanc, Harry S.: *See*—
Beacham, Lowrie M., III; LeBlanc, Harry S.; and Freeman, George A., 4,874,751, Cl. 514-50.000.

Leboucq, Jacques: *See*—
Boniort, Jean-Yves; and Leboucq, Jacques, 4,874,415, Cl. 65-3.110.

Lecaroz, Jean. Elements having a multi-directional cellular structure whose inertia may vary, and methods of manufacture. 4,873,810, Cl. 52-575.000.

Le Dall, Jean-Claude; and Marchand, Jean-Claude, to Institut Francais du Petrole et Geomecanique. Connection device for the mechanical and electrical connection of a multi-conductor cable to a well probe. 4,874,328, Cl. 439-278.000.

Lederman, Frederick E., to General Motors Corporation. Roller clutch with improved lubrication. 4,874,069, Cl. 192-45.000.

Lee, Chi-Long; and Willis, Robin L., Jr., to Dow Corning Corporation. Microencapsulated platinum-group metals and compounds thereof. 4,874,667, Cl. 428-402.220.

Lee, Gim F., Jr.; Heuschen, Jean M.; and Van Der Meer, Roelof, to General Electric Company. Impact modified polyphenylene ether-polyamide compositions. 4,874,810, Cl. 524-505.000.

Lee, James H.: *See*—
Dickstein, Heidi L.; Hiraoka, Hiroyuki; and Lee, James H., 4,875,124, Cl. 360-126.000.
Lee, Siu-Leung, to Battelle Development Corporation. Chromatographic process. 4,874,520, Cl. 210-635.000.
Lee, Thomas D-Y: *See*—
Youssefyeh, Raymond; Chakraborty, Utpal; Magnien, Ernest; Desai, Rohit; and Lee, Thomas D-Y, 4,874,769, Cl. 514-314.000.
Leffingwell, Burton C.: *See*—
Velke, David C., Sr.; Marsden, George P.; and Leffingwell, Burton C., 4,874,909, Cl. 174-845.000.
Lefkowitz, Leonard R. Regenerable filter. 4,874,407, Cl. 55-213.000.
Legault, Clayton M., to Du Pont Canada Inc. Method and apparatus for tinting yarn. 4,874,390, Cl. 8-149.100.
Legvold, Vernon J.: *See*—
Iskiyan, James L.; Legvold, Vernon J.; Leung, Peter L. H.; and Martin, Guy E., 4,875,155, Cl. 364-200.000.
Lehmann, Lutz: *See*—
Heppke, Gerd; Scherowsky, Gunter; Bahr, Christian; and Lehmann, Lutz, 4,874,545, Cl. 252-299.610.
Lehmann, Volker: *See*—
Foell, Helmut; and Lehmann, Volker, 4,874,484, Cl. 204-129.300.
Lehrman, Sandra N.: *See*—
Rideout, Janet L.; Barry, David W.; Lehrman, Sandra N.; St. Clair, Martha H.; and Furman, Phillip A., 4,874,609, Cl. 424-85.400.
Leipold, Ludwig; Sander, Rainald; Tihanyi, Jenoe; and Weber, Roland, to Siemens Aktiengesellschaft. Circuit configuration for monitoring a semiconductor structural element and providing a signal when the temperature exceeds a predetermined level. 4,875,131, Cl. 361-103.000.
Lemelson, Jerome H. Production of crystalline structures. 4,874,596, Cl. 423-446.000.
Lemmen, Arie W. Arrow sling device, and methods of constructing and utilizing same. 4,873,963, Cl. 124-20.00B.
Lenz, Kenneth: *See*—
Frommelt, John A.; and Lenz, Kenneth, 4,873,800, Cl. 52-173.0DS.
Leonard, Vurnen; Kato, Arthur K.; Ohmori, Kiyoshi; Fujiwara, Keisuke; and Soda, Yutaka, to Minnesota Mining and Manufacturing Company; and Sony Corporation. Disc cartridge. 4,875,128, Cl. 360-133.000.
Leonardo, Covi; Giorgio, Bacialli; and Raffaele, Degli E. Method for black dyeing pasta foodstuffs, and foodstuffs obtained by said method. 4,874,619, Cl. 426-94.000.
Leone, Ronald E.: *See*—
Gunther, Wolfgang H. H.; Leone, Ronald E.; and Przyklek, Rosemary, 4,874,866, Cl. 548-100.000.
Lerch, Alan E.: *See*—
McMeekin, James H.; Lerch, Alan E.; Chollock, Ronald S.; and Wesdock, James F., 4,874,940, Cl. 250-223.00B.
Lerner, Marshall A.: *See*—
Gotman, Alexander S., 4,874,275, Cl. 411-5.000.
Leung, Peter L. H.: *See*—
Iskiyan, James L.; Legvold, Vernon J.; Leung, Peter L. H.; and Martin, Guy E., 4,875,155, Cl. 364-200.000.
Leuzinger, Christoph: *See*—
Anger, Wilhelm; and Leuzinger, Christoph, 4,873,994, Cl. 128-774.000.
Leveque, Denis J., to Eaton Corporation. Circuit board and sensing coil positioning system for proximity sensor. 4,875,009, Cl. 324-208.000.
Lever Brothers Company: *See*—
Castenmiller, Wilhelmus A. M.; Chesters, Allan K.; and Ernsting, Peter B., 4,874,626, Cl. 426-564.000.
Leverone, Marianne F.: *See*—
Boudreaux, Donald P.; Matrozza, Mark A.; and Leverone, Marianne F., 4,874,704, Cl. 435-252.900.
Levy, Lloyd: *See*—
Slezak, Arnold; and Levy, Lloyd, 4,875,117, Cl. 360-98.010.
Lewyn, Lanny L., to Brooktree Corporation. Centroiding algorithm for networks used in A/D and D/A converters. 4,875,046, Cl. 341-148.000.
Liapis, Athanasios I.; Findley, Marshall E.; and Nguyen, Hoa T., to University of Missouri, The Curators of the. Separation of adsorbed components by variable temperature desorption. 4,874,524, Cl. 210-672.000.
Liautaud, Jacques: *See*—
Makula, Marie-France; and Liautaud, Jacques, 4,874,708, Cl. 435-272.000.
Licht, Brigitte H.: *See*—
Kanluen, Ratana; and Licht, Brigitte H., 4,874,827, Cl. 526-214.000.
Lidak Biopharmaceuticals: *See*—
Katz, David H., 4,874,794, Cl. 514-724.000.
Liesch, Jerrold M.: *See*—
Huang, Leeyuan; Koupal, Lawrence; Dunn, Joseph, Jr.; Liesch, Jerrold M.; Hensens, Otto; and Woodruff, H. Boyd, 4,874,745, Cl. 514-18.000.
Life Loc, Inc.: *See*—
Lopez, Benjamin L.; Beard, Steven A.; and Phillips, Kirby, 4,874,299, Cl. 417-413.000.
Lifeblood Advanced Blood Bank Systems, Inc.: *See*—
Harms, Frank M.; Tripp, Victor; and Wells, Thomas B., 4,874,915, Cl. 219-10.55F.
Lim, Soon K.: *See*—
Kim, Myung S.; Kang, Hyun S.; Lim, Soon K.; and Park, Hee K., 4,874,717, Cl. 437-31.000.
Lin, Henry C.: *See*—
O'Reilly, Neil J.; and Lin, Henry C., 4,874,876, Cl. 549-49.000.
Lindemann, Peer; and Haughton, Victor M., to Servetus Partnership. Safety syringe. 4,874,382, Cl. 604-195.000.
Lindroth, Thomas A.: *See*—
Colegrove, George T.; and Lindroth, Thomas A., 4,874,423, Cl. 71-95.000.
Colegrove, George T.; and Lindroth, Thomas A., 4,874,854, Cl. 536-114.000.
Linke, Thomas A.; Dandan, Issa R.; Livingston, Troy W.; and Wilkerson, Alan W., to Buehler, Ltd. Polishing apparatus. 4,873,792, Cl. 51-165.800.
Linker, Frank V.; and Linker, Frank V., Jr., to American Tech Manufacturing Corp. Switch track assembly for high-speed handling of electronic components. 4,874,075, Cl. 193-39.000.
Linker, Frank V., Jr.: *See*—
Linker, Frank V.; and Linker, Frank V., Jr., 4,874,075, Cl. 193-39.000.
Lion Corporation: *See*—
Adachi, Kuniaki; Tamai, Hideo; and Sadai, Masanao, 4,874,791, Cl. 514-558.000.
Lions Eye Inst. of Western Australia: *See*—
Cringle, Stephen J., 4,874,237, Cl. 351-221.000.
Liqui-Box Corporation: *See*—
Ulm, John G., 4,874,023, Cl. 141-346.000.
Litchfield, Peter G. Ball. 4,874,169, Cl. 273-60.00R.
Litvay, John D.: *See*—
Cochrane, Faith E.; Smith, Michael J.; and Litvay, John D., 4,874,465, Cl. 162-111.000.
Liu, Chung-Tsing: *See*—
Greenwald, Richard B.; Liu, Chung-Tsing; and McDonell, James A., 4,874,540, Cl. 252-174.240.
Livingston, Troy W.: *See*—
Linke, Thomas A.; Dandan, Issa R.; Livingston, Troy W.; and Wilkerson, Alan W., 4,873,792, Cl. 51-165.800.
Livsey, Ian: *See*—
Callaghan, Ian C.; and Livsey, Ian, 4,874,535, Cl. 252-8.552.
Lo, Shui-Yin, to Apricot S.A. Method and apparatus for generating coherent bosons. 4,875,213, Cl. 372-5.000.
Lo, Ying-Cheng; and Humphries, Darral V., to Kusan, Inc. Methods of producing biaxially-oriented polymer product, and the product produced thereby. 4,874,657, Cl. 428-220.000.
Logic Replacement Technology, Limited: *See*—
Dalzell, David T., 4,875,201, Cl. 368-120.000.
Lok, Hin C. Safety letter opener. 4,873,767, Cl. 30-278.000.
Lombardino, Joseph G.: *See*—
Crawford, Thomas C.; Keely, Stanley L.; Larson, David L.; Lombardino, Joseph G.; and Maciejko, James J., 4,874,757, Cl. 514-226.500.
Loop-A-Line, Inc.: *See*—
McGahee, Welbourne D.; and Campbell, John W., 4,873,783, Cl. 43-42.240.
Lopatin, George; Yen, Larry Y.; and Rogers, Randall R., to Millipore Corporation. Microporous membranes from polypropylene. 4,874,567, Cl. 264-45.100.
Lopez, Benjamin L.; Beard, Steven A.; and Phillips, Kirby, to Life Loc, Inc. High precision pump. 4,874,299, Cl. 417-413.000.
Lorenzen, David M., to North American Philips Corporation. Device for sensing the angular position of a shaft. 4,875,008, Cl. 324-208.000.
Lougheed, William M.: *See*—
Walsh, David J.; Lougheed, William M.; Gentili, Fred; and Fazl, Mahmood, 4,873,975, Cl. 128-334.00R.
Loughrin, Thomas D., to Durkee Industrial Foods Corporation. Packaging method and system for edible solid fats and the like. 4,874,621, Cl. 426-124.000.
Lowry, Alan B.: *See*—
Joannou, Kyriacos; Wilson, Kenneth; and Lowry, Alan B., 4,875,125, Cl. 360-128.000.
Lowry, Michael L.: *See*—
Niedringhaus, Joyce C.; and Lowry, Michael L., 4,874,428, Cl. 75-30.000.
Lowther, Frank E., to APTI, Inc. Nuclear-sized explosions without radiation. 4,873,928, Cl. 102-323.000.
Lu, Chih-Hsiung; and Lu, Jill H. Anti-glare shield for the front windshield of cars. 4,874,195, Cl. 296-97.400.
Lu, Jill H.: *See*—
Lu, Chih-Hsiung; and Lu, Jill H., 4,874,195, Cl. 296-97.400.
Lucas Industries Public Limited Company: *See*—
Greeves, Godfrey; Potter, James C.; Andrews, Richard J.; and Harris, Kenneth M., 4,874,301, Cl. 417-462.000.
Law, David J. C.; and Panesar, Lukhbir S., 4,873,959, Cl. 123-458.000.
Lucky, Ltd.: *See*—
Jung, Sang H.; and Kim, Seung K., 4,874,887, Cl. 560-124.000.
Ludin, Ludwig: *See*—
Laing, Karsten A.; Ludin, Ludwig; and Laing, Johannes N., 4,874,300, Cl. 411-420.000.
Ludwig Schwerdtel GmbH: *See*—
Schwerdtel, Ernst; and Lang, Hans-Jorg, 4,874,022, Cl. 141-165.000.
Luetzelschwab, Wayne E., to Marathon Oil Company. Apparatus and method for mixing a gel and liquid. 4,874,248, Cl. 366-307.000.
Luisoli, Reto: *See*—
Stegmann, Werner; Meier, Hans R.; Evans, Samuel; Martin, Roger; and Luisoli, Reto, 4,874,885, Cl. 560-15.000.
Lukacs, Alexander, III, to Hercules Incorporated. Heat resistant thermosetting phosphazene-imide copolymers. 4,874,828, Cl. 526-262.000.

Lukens, Jean H.: *See*—
Durbin, Richard D.; Lukens, Jean H.; Uchytil, Thomas F.; and Rhodehamel, Nicholas, 4,874,706, Cl. 435-253.300.
Lundqvist, Inge J.: *See*—
Karlsson, Hakan I.; Lundqvist, Inge J.; Hardin, Bengt Y.; and Ostman, Thomas L., 4,874,467, Cl. 162-198.000.
Lundy, Charles E.; Krishnan, Sivaram; and Reinert, Gerard E., to Mobay Corporation. Polycarbonate compositions resistant to gamma radiation. 4,874,802, Cl. 524-94.000.
Lustig, Robert S. Combined canoe seat and portage yoke. 4,873,935, Cl. 114-347.000.
Luther, Ronald B.; and Hannaford, Billy H. Dip formed catheter and assembly. 4,874,373, Cl. 604-164.000.
Luttmer, David J.; Panian, Thomas L.; Wixey, Barry D.; and Wilson, Raymond L., to Delta International Machinery Corp. Capacitive measurement system. 4,873,770, Cl. 33-706.000.
Lutz, Robert G.: *See*—
George, Eric R.; Lutz, Robert G.; and Smutny, Edgar J., 4,874,819, Cl. 525-185.000.
Lynch, Carol J.; and Corday, Debbie J. Temporary detachable doorway screen apparatus. 4,874,028, Cl. 160-332.000.
Lynch, David L.; and Quesnel, Guy C., to Northern Telecom Limited. Variable gain encoder apparatus and method. 4,875,045, Cl. 341-139.000.
Lynch, Samuel E.: *See*—
Antoniades, Harry N.; and Lynch, Samuel E., 4,874,746, Cl. 514-21.000.
Lyons, Dale R.; and Beam, Don E., to NCR Corporation. Anti-jamming up device for a drawer. 4,873,850, Cl. 70-85.000.
Lyons, Robert, Sr., to Bilco Company, The. Torque rod operated counterbalancing hinge and door assembly. 4,873,791, Cl. 49-386.000.
M&T Chemicals Inc.: *See*—
Hung, Paul L. K.; and Tseng, Kenneth K. S., 4,874,799, Cl. 522-96.000.
MacArthur, James B.; Comolli, Alfred G.; and McLean, Joseph B., to HRI, Inc. Catalytic two-stage coal hydrogenation process using extinction recycle of heavy liquid fraction. 4,874,506, Cl. 208-413.000.
Maciejko, James J.: *See*—
Crawford, Thomas C.; Keely, Stanley L.; Larson, David L.; Lombardino, Joseph G.; and Maciejko, James J., 4,874,757, Cl. 514-226.500.
Mackay, Craig D., to Astromed Limited. Analysis of samples by electrophoresis using a charge coupled device. 4,874,492, Cl. 204-182.800.
Macklem, Elizabeth A.: *See*—
Pulkowski, Jeffrey H.; Macklem, Elizabeth A.; and Busker, L. H., 4,874,469, Cl. 162-359.000.
MacMahon, Alistair J.: *See*—
Newman, Alec T.; Bentley, Andrew C.; King, Christine A.; MacMahon, Alistair J.; Tansley, Robert W.; and Gibbs, Andrew R., 4,873,915, Cl. 99-289.00R.
Madou, Marc J.; and Otagawa, Takaaki, to SRI International. Microelectrochemical sensor and sensor array. 4,874,500, Cl. 204-412.000.
Maeda, Akira; Sano, Koichi; Yokoyama, Tetsuo; Koizumi, Hideaki; and Mizuno, Hirotaka, to Hitachi, Ltd. Image reconstruction method in nuclear magnetic resonance imaging system. 4,875,012, Cl. 324-309.000.
Maeda, Hiroshi: *See*—
Matsuda, Tsukasa; Ui, Kazuo; and Maeda, Hiroshi, 4,874,089, Cl. 206-397.000.
Maeda, Shuji: *See*—
Sakamoto, Takaaki; Itoh, Munehiko; and Maeda, Shuji, 4,874,826, Cl. 525-534.000.
Maeno, Mikihiko; Ohta, Yukio; Momiyama, Yoshiharu; Ono, Hisao; Takahata, Katsumasa; Ozono, Kazuyuki; Shimizu, Makoto; and Yamamoto, Mikio, to Oki Electric Industry Co., Ltd. Paper feed device and paper cassette therefor. 4,874,159, Cl. 271-171.000.
Magidson, Mark; and Huber, Otto L., to Moldex/Metric Products, Inc. Disposable filter respirator with inner molded face flange. 4,873,972, Cl. 128-206.120.
Magistro, Angelo J., to B. F. Goodrich Company, The. Triazine-containing multisilane coupling agents for coating glass fibers, for adhesives, and for protective coatings. 4,874,858, Cl. 544-196.000.
Magma Copper Company: *See*—
Sorensen, James L.; Yarbro, Mark D.; and Glockner, Charles A., 4,874,534, Cl. 210-803.000.
Magnavox Government and Industrial Electronics Company: *See*—
Richeson, William E.; and Erickson, Frederick L., 4,873,948, Cl. 123-90.110.
Magnetic Peripherals Inc.: *See*—
Kaymaram, Farid, 4,875,118, Cl. 360-99.120.
Minuhin, Vadim B.; Berzon, Evgeny J.; and VonDeylen, Vernon F., 4,875,108, Cl. 360-51.000.
Magnetics North, Inc.: *See*—
Fritz, Alan J., 4,874,508, Cl. 209-214.000.
Magni Systems, Inc.: *See*—
Judge, John L., 4,875,089, Cl. 358-10.000.
Magnien, Ernest: *See*—
Youssefyeh, Raymond; Chakraborty, Utpal; Magnien, Ernest; Desai, Rohit; and Lee, Thomas D-Y, 4,874,769, Cl. 514-314.000.
Maher, Jack, deceased (by Maher, Molly Veronica, Robert James Maher, co-executors), to Riyate Pty. Limited. Steam treatment of crops. 4,873,772, Cl. 34-60.000.
Maher, Molly Veronica, Robert James Maher, co-executors: *See*—
Maher, Jack, deceased, 4,873,772, Cl. 34-60.000.
Mainardi, Bruno; and Vivian, Domenico, to Nuova Sme S.p.A. Double selectable delivery pump. 4,874,298, Cl. 417-315.000.
Maio, Kenji: *See*—
Shimizu, Toshihiko; Hotta, Masao; and Maio, Kenji, 4,875,048, Cl. 341-156.000.
Makita, Kensuke; Hattori, Akimasa; and Tanaka, Katsuto, to Central Glass Company, Limited. Method of forming patterned film on substrate surface by using metal alkoxide sol. 4,874,462, Cl. 156-635.000.
Makita, Nobuhiro: *See*—
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.
Makiyama, Hiroyuki: *See*—
Murasaki, Sadanobu; and Makiyama, Hiroyuki, 4,874,161, Cl. 271-265.000.
Makula, Marie-France; and Liautaud, Jacques. Process for the preparation of intra-venously administered gamma-globulins and the gamma-globulins obtained. 4,874,708, Cl. 435-272.000.
Malhi, Satwinder D. S.; Shen, Chi-Cheong; Bean, Kenneth E.; and Chang, Peng-Heng, to Texas Instruments Incorporated. Silicon-on-insulator integrated circuits and method. 4,875,086, Cl. 357-54.000.
Mallard Products, Inc.: *See*—
Velie, Wallace W., 4,874,012, Cl. 137-557.000.
MAN Poland Druckmaschinen AG: *See*—
Simeth, Claus; and Gensheimer, Valentin, 4,873,926, Cl. 101-409.000.
Mancuso, Matthew A., to Keibler-Thompson Corporation. Apparatus for removing dross ridges from the sides and ends of a metal workpiece. 4,874,274, Cl. 409-300.000.
Mangold, Donald J.: *See*—
Wilson, Wilfred W.; Polemenakos, Sotiros C.; Potter, J. Larry; Mangold, Donald J.; Harlowe, William W.; and Schlameus, Herman W., 4,874,611, Cl. 424-410.000.
Manning, Douglas E. Hydraulic press platon support. 4,873,923, Cl. 100-258.00R.
Manterola, Maria De La Paloma M.: *See*—
Sanchez-Robles, Francisco B.; and Manterola, Maria De La Paloma M., 4,874,131, Cl. 239-307.000.
Maoz, Barak, to Grumman Aerospace Corporation. Variable attenuator having voltage variable FET resistor with chosen resistance-voltage relationship. 4,875,023, Cl. 333-81.00R.
Maramed Precision Corporation: *See*—
Finnieston, Alan; Burkhalter, William E.; Reyes, Franklin; and Latta, Loren L., 4,873,968, Cl. 128-87.00R.
Marathon Oil Company: *See*—
Luetzelschwab, Wayne E., 4,874,248, Cl. 366-307.000.
Marchand, Jean-Claude: *See*—
Le Dall, Jean-Claude; and Marchand, Jean-Claude, 4,874,328, Cl. 439-278.000.
Mariano, Arturo C.: *See*—
Heisey, Raymond K., Jr.; Barker, W. David; Mariano, Arturo C.; and Thurnau, Vernon L., 4,873,808, Cl. 52-478.000.
Marino, Frank J., to Marino Technologies, Inc. Bulk cargo container with inner liner. 4,874,258, Cl. 383-111.000.
Marino Technologies, Inc.: *See*—
Marino, Frank J., 4,874,258, Cl. 383-111.000.
Maritano, Mauro: *See*—
Fiore, Leonardo; Motroni, Giuseppe; and Maritano, Mauro, 4,874,838, Cl. 528-408.000.
Markovs, John, to UOP. Purification of fluid streams containing mercury. 4,874,525, Cl. 210-673.000.
Markpoint System AB: *See*—
Vonasek, Jiri, 4,875,058, Cl. 346-140.00R.
Marolda, Victor J., Jr., to United States of America, Navy. Elastomeric electrical isolation membrane. 4,874,326, Cl. 439-273.000.
Marpam International, Inc.: *See*—
Edwards, Bryant, 4,874,367, Cl. 604-72.000.
Marsden, George P.: *See*—
Velke, David C., Sr.; Marsden, George P.; and Leffingwell, Burton C., 4,874,909, Cl. 174-845.000.
Marsh, Edward K., to AMP Incorporated. Shielded electrical connector for printed circuit board mounting. 4,874,336, Cl. 439-607.000.
Marshall, Lyman R., to Scherer Healthcare Ltd. Surgical drape. 4,873,997, Cl. 128-849.000.
Marshall, Robert M., to Allied-Signal Inc. Overfinish for abrasion resistant zero twist fabric. 4,874,663, Cl. 428-272.000.
Martin, Anthony N., to United Technologies Corporation. Engine speed control apparatus. 4,875,168, Cl. 364-431.010.
Martin, Charles L., to Raychem Corporation. Heat-recoverable composition coupling device. 4,874,193, Cl. 285-369.000.
Martin Engineering Company: *See*—
Swinderman, Robert T., 4,874,082, Cl. 198-836.000.
Martin, Guy E.: *See*—
Iskiyan, James L.; Legvold, Vernon J.; Leung, Peter L. H.; and Martin, Guy E., 4,875,155, Cl. 364-200.000.
Martin, Roger: *See*—
Stegmann, Werner; Meier, Hans R.; Evans, Samuel; Martin, Roger; and Luisoli, Reto, 4,874,885, Cl. 560-15.000.
Martorell, D. Aurelio T., to Geiver, S.A. Portable vibrating apparatus for the collection of fruits. 4,873,820, Cl. 56-340.100.
Maruta, Kenzi: *See*—
Hatanaka, Koji; Maruta, Kenzi; and Suwabe, Hirohisa, 4,874,923, Cl. 219-270.000.

Maruta, Riichiro: *See*—
Yamamoto, Shosaku; Kakinuma, Kazuo; Ishioka, Hiroshi; Sodeyama, Fumio; Mayumi, Junji; and Maruta, Riichiro, 4,874,818, Cl. 525-183.000.
Maruyama, Toshio: *See*—
Asano, Hiroaki; Tsujiuchi, Toshio; Yoneda, Takao; Ishihara, Nobuhiro; Maruyama, Toshio; and Ohta, Norio, 4,873,793, Cl. 51-165.710.
Maruzen Petrochemical Co., Ltd.: *See*—
Tsuchitani, Masatoshi; and Naito, Sakae, 4,874,502, Cl. 208-45.000.
Maruzeni, Shoji; Matsumoto, Wataru; and Yasuda, Nozomi, to Asahi Denka Kogyo Kabushiki Kaisha. Reaction method for transesterifying fats and oils. 4,874,699, Cl. 435-135.000.
Marvin Glass & Associates: *See*—
Kuna, Wayne A., 4,874,166, Cl. 273-1.0GC.
Marx, Jean: *See*—
Egee, Michel; Dartois, Robert; Marx, Jean; Merienne, Etienne; Regalia, Marcel; Poplimont, Philippe; and Van Schel, Etienne, 4,875,175, Cl. 364-551.010.
Maschinenfabrik Andritz Actiengesellschaft: *See*—
Jeney, Josef, 4,874,591, Cl. 423-240.000.
Sbaschnigg, Johann; and Petschauer, Franz, 4,874,468, Cl. 162-300.000.
Masco Corporation of Indiana: *See*—
Pickerrell, Daniel A.; Schrock, Donald C.; and Turner, Larry G., 4,874,009, Cl. 137-454.600.
Mashiko, Toshihisa: *See*—
Yamada, Shin-ichi; Goto, Takao; Mashiko, Toshihisa; Kogi, Kentaro; Oguchi, Yukiko; and Narita, Senichi, 4,874,760, Cl. 514-234.200.
Masia, Michael: *See*—
Reed, James P.; Masia, Michael; and Highe, Albert, 4,874,487, Cl. 204-147.000.
Maslanka, Daniel C.: *See*—
Daniels, Steven D.; Maslanka, Daniel C.; and Morse, John E., 4,875,122, Cl. 360-109.000.
Massachusetts Institute of Technology: *See*—
Saito, Haruo; Kranz, David M.; Eisen, Herman N.; and Tonegawa, Susumu, 4,874,845, Cl. 530-395.000.
Smith, Rosemary L.; and Collins, Scott D., 4,874,499, Cl. 204-403.000.
Masuda, Isao; Fukuoka, Takashi; and Kobayashi, Fujio, to Kioritz Corporation. Two-cycle internal combustion engine. 4,873,946, Cl. 123-65.0PD.
Masuda, Kazuaki, to Canon Kabushiki Kaisha. With a liquid supply path having disposed therein a filler providing partial flow blockage that varies upstream of the discharge orefice. 4,875,059, Cl. 346-140.00R.
Masuda, Kenji, to Sanden Corporation. Heating and air conditioning system for a forklift. 4,874,036, Cl. 165-42.000.
Masuda, Koji; Suemitsu, Yuji; and Asano, Kazuo, to Fuji Xerox Co., Ltd. Discharge head for an electrostatic recording device. 4,875,060, Cl. 346-155.000.
Masuda, Yoshihiko; and Murakosi, Masanobu, to Kioritz Corporation. Method of adjusting hardness of metallic material. 4,874,437, Cl. 148-150.000.
Masui, Toshiyuki: *See*—
Kashida, Motokazu; and Masui, Toshiyuki, 4,875,222, Cl. 375-26.000.
Masunaga, Katsuro: *See*—
Shiomi, Yasushi; Matsuzaki, Tokuo; and Masunaga, Katsuro, 4,874,888, Cl. 560-204.000.
Masuo, Yoshihisa, to Omron Tateisi Electronics Co. Method of making a thermometer probe. 4,873,758, Cl. 29-612.000.
Masuyama, Takeshi: *See*—
Matsukawa, Hideki; Masuyama, Takeshi; Hirota, Minoru; Wakahata, Yasuo; Itoh, Masahiro; and Harada, Shinji, 4,874,227, Cl. 350-334.000.
Matayoshi, Yutaka: *See*—
Muranaka, Shigeo; Ohkawa, Kouzaburou; Yokoyama, Junichi; Matayoshi, Yutaka; and Kamegaya, Shigeru, 4,873,953, Cl. 123-308.000.
Mathewes, James K., Jr.; Chancellor, Craig A.; and Howes, H. Frank, to Raytheon Company. Transient and intermittent fault insertion. 4,875,209, Cl. 371-3.000.
Mathis, Robert B.: *See*—
Ferriter, Kate M.; and Mathis, Robert B., 4,875,162, Cl. 364-401.000.
Matrozza, Mark A.: *See*—
Boudreaux, Donald P.; Matrozza, Mark A.; and Leverone, Marianne F., 4,874,704, Cl. 435-252.900.
Matsuda, Tsukasa; Ui, Kazuo; and Maeda, Hiroshi, to Fuji Photo Film Co., Ltd. Light-tight cassette. 4,874,089, Cl. 206-397.000.
Matsui, Masataka; Aono, Toshiaki; Tanimoto, Yoshio; Nakahama, Tadamitsu; and Yamane, Takakazu, to Mazda Motor Corporation. Coating method in coating line and coating apparatus therefor. 4,874,639, Cl. 427-240.000.
Matsukawa, Hideki; Masuyama, Takeshi; Hirota, Minoru; Wakahata, Yasuo; Itoh, Masahiro; and Harada, Shinji, to Matsushita Electric Industrial Co., Ltd. Large-sized liquid crystal display. 4,874,227, Cl. 350-334.000.
Matsumoto, Akio: *See*—
Ito, Haruyuki; and Matsumoto, Akio, 4,874,304, Cl. 425-84.000.
Matsumoto, Shuichi; and Murakami, Hitomi, to Kokusai Denshin Denwa Kabushiki Kaisha. Noise-shaping predictive coding system. 4,875,095, Cl. 358-133.000.
Matsumoto, Takayuki: *See*—
Watanabe, Naoto; Tanaka, Akira; Matsumoto, Takayuki; Ohmura, Yutaka; and Kojima, Hisao, 4,873,760, Cl. 29-714.000.
Matsumoto, Tetsuro, to Hitachi, Ltd. Semiconductor memory with an improved nibble mode arrangement. 4,875,192, Cl. 365-193.000.
Matsumoto, Wataru: *See*—
Maruzeni, Shoji; Matsumoto, Wataru; and Yasuda, Nozomi, 4,874,699, Cl. 435-135.000.
Matsumura, Yasushi: *See*—
Sugisawa, Ko; Matsumura, Yasushi; Okamoto, Hidefumi; and Hayami, Hiroshi, 4,874,580, Cl. 422-25.000.
Matsunaga, Kenichi: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,874,750, Cl. 514-42.000.
Matsunaga, Nobuyuki: *See*—
Endo, Toshihiko; and Matsunaga, Nobuyuki, 4,874,807, Cl. 524-267.000.
Matsuoka, Ken; and Yamazaki, Masanobu, to Fuji Kiko Company, Limited. Grooved pulley and manufacturing method therefor. 4,874,353, Cl. 474-168.000.
Matsuoka, Morito; and Ono, Ken'ichi, to Nippon Telegraph and Telephone Corporation. Thin film forming apparatus. 4,874,497, Cl. 204-298.000.
Matsushima, Yasunobu: *See*—
Sonoda, Sakae; Hetsugi, Kouji; Sawasaki, Yoshihiko; Kaburagi, Kouji; and Matsushima, Yasunobu, 4,874,480, Cl. 204-56.100.
Matsushima, Yuichi: *See*—
Utaka, Katsuyuki; Sakai, Kazuo; Matsushima, Yuichi; and Akiba, Shigeyuki, 4,874,216, Cl. 350-96.190.
Matsushita Electric Industrial Co., Ltd.: *See*—
Fukui, Masahiro, 4,875,139, Cl. 361-410.000.
Kasai, Isao, 4,874,928, Cl. 219-492.000.
Kodo, Toshikazu; and Tanaka, Shinichi, 4,875,202, Cl. 369-32.000.
Koshiba, Nobuharu; Ikehata, Toshihiko; and Takata, Kenichi, 4,874,680, Cl. 429-197.000.
Matsukawa, Hideki; Masuyama, Takeshi; Hirota, Minoru; Wakahata, Yasuo; Itoh, Masahiro; and Harada, Shinji, 4,874,227, Cl. 350-334.000.
Murai, Katsumi; and Usui, Makoto, 4,875,211, Cl. 371-40.100.
Takamura, Yoshinari; Obara, Kazuaki; and Nagashima, Michiyoshi, 4,875,203, Cl. 369-46.000.
Matsushita Electric Works, Ltd.: *See*—
Sakamoto, Takaaki; Itoh, Munehiko; and Maeda, Shuji, 4,874,826, Cl. 525-534.000.
Matsushita, Takashi; and Yanai, Genzo, to Sanden Corporation. Method and arrangement for securing a pulley to a rotor in an electromagnetic clutch. 4,874,973, Cl. 310-78.000.
Matsuyama, Jiro, to Mitsubishi Denki Kabushiki Kaisha. Viscosity damper. 4,873,888, Cl. 74-574.000.
Matsuzaki, Tokuo: *See*—
Shiomi, Yasushi; Matsuzaki, Tokuo; and Masunaga, Katsuro, 4,874,888, Cl. 560-204.000.
Mattei, Vittorio: *See*—
Ringdahl, Ulf; and Mattei, Vittorio, 4,874,021, Cl. 141-85.000.
Mattel, Inc.: *See*—
Rosenthal, Doren, 4,874,343, Cl. 446-175.000.
Matthes, Hans G., to AEG-Elotherm GmbH. Parallel oscillatory circuit frequency converter with safety circuit. 4,875,150, Cl. 363-51.000.
Matthews, Bernard T.; Joll, David J.; and Ziauddin, Habeeb M., to Bernard Matthews plc. Method for making a coextruded meat product. 4,874,623, Cl. 426-272.000.
Matuska, David G.; and Ferris, Donald L., to United States of America, Army. Apparatus for damping helicopter rotor blade oscillations. 4,874,292, Cl. 416-140.000.
Maurer, Donald D., to Empi, Inc. Vaginal stimulator for controlling urinary incontinence in women. 4,873,996, Cl. 128-844.000.
Max-Planck-Gesellschaft zur Foerderung der Wissenschften e.V.: *See*—
Kettenring, Gunther, 4,874,138, Cl. 242-54.00R.
Maymar, Milan J.: *See*—
Ryan, Thomas W., III; Maymar, Milan J.; and Anderson, Orin M., 4,873,947, Cl. 123-78.00C.
Mayne, James K., to American Brush Corporation. Paint brush holder. 4,874,087, Cl. 206-362.400.
Mayumi, Junji: *See*—
Yamamoto, Shosaku; Kakinuma, Kazuo; Ishioka, Hiroshi; Sodeyama, Fumio; Mayumi, Junji; and Maruta, Riichiro, 4,874,818, Cl. 525-183.000.
Mazda Motor Corporation: *See*—
Kijima, Takao; and Edahiro, Takeshi, 4,874,185, Cl. 280-690.000.
Matsui, Masataka; Aono, Toshiaki; Tanimoto, Yoshio; Nakahama, Tadamitsu; and Yamane, Takakazu, 4,874,639, Cl. 427-240.000.
Tanaka, Hideki, 4,873,961, Cl. 123-564.000.
Watanabe, Kenichi, 4,874,054, Cl. 180-140.000.
Yamamoto, Takeshi, 4,874,199, Cl. 296-192.000.
Mazurek, Tadeusz L. Adjustable ratchet wrench for keyed shafts. 4,873,899, Cl. 81-63.000.
McAlpine, James B.: *See*—
Katz, Leonard; Tuan, James; and McAlpine, James B., 4,874,748, Cl. 514-29.000.
McArthur, William; and Soukup, Thomas M. Non-reusable syringe. 4,874,372, Cl. 604-110.000.
McAuliffe, Lawrence, Jr., to Colt Industries Inc. Idle air flow shutoff valve. 4,873,955, Cl. 123-339.000.

McCabe, Raphaela: *See—*
Steinberg, Joseph; and McCabe, Raphaela, 4,874,165, Cl. 273-1.0GC.
McCall, Jones; McClure, Tom; and Monroe, Letcher. Two by one twill weave for an impression fabric. 4,874,263, Cl. 400-241.300.
McCaman, Michael T.: *See—*
Andrews, William H.; Brothers, Virginia M.; Files, James G.; Kuhn, Irene; McCaman, Michael T.; Paul, Leland S.; Sias, Stacey R.; Gore, Thomas C.; Newman, Karel Z., Jr.; and Tedesco, John L., 4,874,705, Cl. 435-252.330.
McCann, James D.; Young, Lawrence R.; and Brandon, John M., to Eastman Kodak Company. Simplified multicolor fluid system for continuous ink jet printer. 4,875,055, Cl. 346-75.000.
McCauley, Archie N.: *See—*
Stierman, Roger J.; McCauley, Archie N.; and Zart, Robert C., 4,874,476, Cl. 204-15.000.
McClung, James A.: *See—*
Bulso, Joseph D., Jr.; and McClung, James A., 4,873,859, Cl. 72-336.000.
McClure, Richard J., to Eastman Kodak Company. Apparatus and method for precise tape guiding in a magnetic tape transport. 4,875,127, Cl. 360-130.210.
McClure, Tom: *See—*
McCall, Jones; McClure, Tom; and Monroe, Letcher, 4,874,263, Cl. 400-241.300.
McConnell, Ronald E.: *See—*
Lafreniere, Dennis R.; and McConnell, Ronald E., 4,874,348, Cl. 453-50.000.
McCoy, Joseph R., to United States of America, Air Force. High lead density vacuum feedthrough. 4,874,910, Cl. 174-152.0GM.
McCullough, Doris E.: *See—*
Carr, F. Patrick; Dillard, Robert D.; and McCullough, Doris E., 4,874,777, Cl. 514-381.000.
McDantim, Inc.: *See—*
Fallon, Merton R.; and Clements, Thomas W., 4,874,116, Cl. 222-399.000.
McDavid, James M., to Texas Instruments Incorporated. Method of making a metal-gate MOS VLSI device. 4,874,720, Cl. 437-203.000.
McDonald, Keith: *See—*
Kay, Peter D.; and McDonald, Keith, 4,874,806, Cl. 524-204.000.
McDonald, Kevin. License plate lenses. 4,874,226, Cl. 350-319.000.
McDonell, James A.: *See—*
Greenwald, Richard B.; Liu, Chung-Tsing; and McDonell, James A., 4,874,540, Cl. 252-174.240.
McEwen, Albert R.; and Forrest, William J. Core sample box. 4,874,091, Cl. 206-443.000.
McGahee, Welbourne D.; and Campbell, John W., to Loop-A-Line, Inc. Side stepper worms with hook pocket. 4,873,783, Cl. 43-42.240.
McGill, Paul E.; and Pitigliano, Frank J., to Somerset Technologies, Inc. Accumulator extrusion head for producing striped parisons. 4,874,305, Cl. 425-131.100.
McInerney Incorporated: *See—*
Curths, Gary, 4,873,823, Cl. 60-293.000.
McKelvey, John L., to Ink Company, The. Ink reclamation system. 4,874,515, Cl. 210-360.100.
McKenzie, Donald E.: *See—*
Gay, Richard L.; and McKenzie, Donald E., 4,874,599, Cl. 423-490.000.
McKinney, Ronald J.; and Osborne, Robert B., to Du Pont de Nemours, E. I., and Company. Promoter synergism in pentenenitrile hydrocyanation. 4,874,884, Cl. 558-338.000.
McLaughlin, David F.; and Stoltz, Richard A., to Westinghouse Electric Corp. Molten salt extractive distillation process for zirconium-hafnium separation. 4,874,475, Cl. 203-51.000.
McLean, Joseph B.: *See—*
MacArthur, James B.; Comolli, Alfred G.; and McLean, Joseph B., 4,874,506, Cl. 208-413.000.
McLeod, H. C. Briquets for smoke seasoning food products. 4,874,396, Cl. 44-589.000.
McMahon, Paul; Chung, Tai-Shung; and Ying, Lincoln, to BASF Structural Materials Inc. Process for preparing tows from composite fiber blends. 4,874,563, Cl. 264-29.200.
McManus, Paul A.; and Beaton, Robert J. Method and apparatus for processing colorimetric parameters of a color sample. 4,875,032, Cl. 340-703.000.
McMeekin, James H.; Lerch, Alan E.; Chollock, Ronald S.; and Wesdock, James F., to Brockway, Inc. (N.Y.). Method and apparatus for inspection of a transparent container. 4,874,940, Cl. 250-223.00B.
McNab, Donald W.: *See—*
Kay, Nathan; McNab, Donald W.; and Moya, Edward J., 4,874,117, Cl. 222-487.000.
McNaughton, R. David. Syringe shield. 4,874,383, Cl. 604-198.000.
McNeil-PC, Inc.: *See—*
Swieringa, Morris K., 4,874,457, Cl. 156-474.000.
McPherson, Daniel W.; Fowler, Joanna S.; and Wolf, Alfred P., to United States of America, Energy. No-carrier-added [^{11}c]putrescine. 4,874,600, Cl. 424-1.100.
McPherson, Walter K.; and Blaker, James L., to TRC, Inc. Redundant signal device for auto crash testing. 4,873,867, Cl. 73-493.000.
Mead Corporation, The: *See—*
Adair, Paul C., 4,874,685, Cl. 430-138.000.
Cousin, Michael J., 4,874,610, Cl. 424-196.100.
Gottschalk, Peter, 4,874,450, Cl. 156-275.500.
Meade, Christopher J. M.: *See—*
Bonjouklian, Rosanne; Meade, Christopher J. M.; Mihelich, Edward D.; and Phillips, Michael L., 4,874,782, Cl. 514-473.000.
Meadows, William H., to National Semiconductor Corporation. High speed CMOS comparator with hysteresis. 4,874,969, Cl. 307-355.000.
Mechanical Technology Incorporated: *See—*
Dhar, Manmohan, 4,873,826, Cl. 60-641.140.
Medical Dynamics, Inc.: *See—*
Bayne, Irman D., 4,873,992, Cl. 128-756.000.
Medical Engineering Corporation: *See—*
Goldberg, Jay R.; and Hillegass, Donald V., 4,874,360, Cl. 604-8.000.
Medice Chem.-Pharm. Fabrik Putter GmbH & Co.: *See—*
Paradies, Henrich H., 4,874,850, Cl. 536-3.000.
Medilase, Inc.: *See—*
Comben, Richard H.; Gilman, Byron L.; and Shturman, Leonid, 4,874,371, Cl. 604-95.000.
Medlock, James R., III: *See—*
Rozanski, Robert D.; Medlock, James R., III; and Larson, Stephen F., 4,875,137, Cl. 361-331.000.
Megaw, John H. P. C.: *See—*
Bransden, Antony S.; Megaw, John H. P. C.; Terry, Malcolm J.; and Ward, Brooke A., 4,874,919, Cl. 219-121.680.
Meier, Hans R.: *See—*
Stegmann, Werner; Meier, Hans R.; Evans, Samuel; Martin, Roger; and Luisoli, Reto, 4,874,885, Cl. 560-15.000.
Melas, Constantin M.: *See—*
Dost, Martin H.; Hopner, Emil; Melas, Constantin M.; and Provazek, Lionel D., 4,875,112, Cl. 360-65.000.
Melby, Jeffrey J.: *See—*
Aho, Kenneth A.; Melby, Jeffrey J.; and Miller, Richard A., 4,874,228, Cl. 350-345.000.
Melton, Hewlett E., Jr.: *See—*
Hunt, Thomas J.; Miller, James G.; Thomas, Lewis J., III; Melton, Hewlett E., Jr.; and Shoup, Thomas A., 4,873,984, Cl. 128-660.070.
Melton, John L.: *See—*
Boyle, Peter C.; Steffen, Daniel G.; Melton, John L.; Coccodrilli, Gus D., Jr.; and Nagy, Michael A., 4,874,606, Cl. 426-74.000.
Menconi, Augusto; Camaggi, Giovanni; Gozzo, Franco; Mirenna, Luigi; and Garavaglia, Carlo, to Montedison S.p.A. Cyanoacetamido-derivatives having a fungicidal activity. 4,874,786, Cl. 514-528.000.
Mendenhall, Abraham H.; Irace, Joseph F.; and Skudrzyk, Joseph, to Packaging Concepts, Inc. Microwavable package incorporating controlled venting. 4,874,620, Cl. 426-113.000.
Meng, Sen Y.: *See—*
Dunn, Charlton; Bremner, Robert J.; and Meng, Sen Y., 4,874,575, Cl. 376-404.000.
Menn, Roger; Brunel, Christian; and Pecile, Dario. Trichromatic electroluminescent matrix screen, and method of manufacture. 4,874,986, Cl. 313-505.000.
Mercer, Roger W.: *See—*
Mercer, Roger W., II; and Mercer, Roger W., 4,874,123, Cl. 227-147.000.
Mercer, Roger W., II; and Mercer, Roger W. Gutter installation tool. 4,874,123, Cl. 227-147.000.
Merck & Co., Inc.: *See—*
Ashe, Bonnie M.; and Fletcher, Daniel S., 4,874,755, Cl. 514-179.000.
Colegrove, George T.; and Lindroth, Thomas A., 4,874,423, Cl. 71-95.000.
Colegrove, George T.; and Lindroth, Thomas A., 4,874,854, Cl. 536-114.000.
Flanagan, Richard J., 4,874,601, Cl. 424-1.100.
Graham, Samuel L.; and Scholz, Thomas H., 4,874,870, Cl. 548-336.000.
Huang, Leeyuan; Koupal, Lawrence; Dunn, Joseph, Jr.; Liesch, Jerrold M.; Hensens, Otto; and Woodruff, H. Boyd, 4,874,745, Cl. 514-18.000.
Mrozik, Helmut, 4,874,749, Cl. 514-30.000.
Merck Patent Gesellschaft mit Beschrankter Haftung: *See—*
Fischer, Wolfgang; and Krenn, Karl D., 4,874,709, Cl. 436-42.000.
Merger, Franz: *See—*
Fischer, Rolf; Merger, Franz; and Gosch, Hans-Juergen, 4,874,889, Cl. 560-205.000.
Merienne, Etienne: *See—*
Egee, Michel; Dartois, Robert; Marx, Jean; Merienne, Etienne; Regalia, Marcel; Poplimont, Philippe; and Van Schel, Etienne, 4,875,175, Cl. 364-551.010.
Mertens, Alfred; von der Saal, Wolfgang; Berger, Herbert; Muller-Beckmann, Bernd; and Strein, Klaus, to Boehringer Mannheim GmbH. Benzodipyrroles, processes for the preparation thereof and pharmaceutical compositions containing them. 4,874,756, Cl. 514-212.000.
Meserol, Peter M.; and Palmieri, Thomas, to Personal Diagnostics, Inc. Cuvette. 4,873,993, Cl. 128-760.000.
Mess-und Therapiegerate GbmH & Co.: *See—*
Schaldach, Max, 4,873,980, Cl. 128-419.000.
Metallgesellschaft Aktiengesellschaft: *See—*
Jury, Egon, 4,874,400, Cl. 55-8.000.
Reifferscheid, Karl J., 4,874,576, Cl. 420-22.000.
Metallogal AG: *See—*
Muller, Gunter; Nagel, Rolf; and Stahli, Jurg, 4,874,812, Cl. 524-712.000.
Metravib R.D.S.: *See—*
Pierre, Andre; Batllteu, Francois; Brosselard, Jean-Pierre; Permuy, Alfred; Pirot, Francois-Xavier; and Spirkovitch, Serge, 4,873,868, Cl. 73-517.00R.

Metz, Charles E.: *See*—
Fencil, Laura E.; Metz, Charles E.; and Doi, Kunio, 4,875,165, Cl. 364-413.220.
Meyer, Dieter, to Paper Converting Machine GmbH. Package handling and re-orienting apparatus, particularly compressive paper rolls, such as toilet paper, kitchen towels, and the like. 4,874,078, Cl. 198-409.000.
Meyer, George R., to Nalco Chemical Company. Amine neutralized alkenylsuccinic anhydride propylene glycol adducts as corrosion inhibitors for hydrocarbon fuels. 4,874,395, Cl. 44-71.000.
Meyer, Rolf-Volker: *See*—
Dujardin, Ralf; Ebert, Wolfgang; Meyer, Rolf-Volker; Berg, Klaus; Grigo, Ulrich; and Wehnert, Wolfgang, 4,874,816, Cl. 525-146.000.
Micalizzi, Charles: *See*—
Olodort, Robert; Micalizzi, Charles; Cambruzzi, Louis; and Turchik, Randy, 4,875,174, Cl. 364-519.000.
Micallef, Jacques. Automatic device for the disinfection of W.C. bowls and seats. 4,873,729, Cl. 4-233.000.
Miceli, Daniel, to Gordon Corporation, The. Post support. 4,874,149, Cl. 248-530.000.
Michalchik, Michael, to Advanced Micro-Matrix, Inc. Pressure sensitive electro-conductive materials. 4,874,549, Cl. 252-511.000.
Michiura, Yoshiharu: *See*—
Fujiki, Hiroyuki; Michiura, Yoshiharu; and Inoue, Kiyoshi, 4,874,645, Cl. 428-31.000.
Micrion Corporation: *See*—
Ward, Billy W.; and Ward, Michael L., 4,874,947, Cl. 250-309.000.
Microelectronics and Computer Technology Corporation: *See*—
Pan, Ju-Don T., 4,874,493, Cl. 204-192.110.
Microlife Technics, Inc.: *See*—
Boudreaux, Donald P.; Matrozza, Mark A.; and Leverone, Marianne F., 4,874,704, Cl. 435-252.900.
Vedamuthu, Ebenezer R., 4,874,616, Cl. 426-43.000.
Micromedics, Inc.: *See*—
Miller, Curtis H.; Arenberg, I. Kaufman; and Altshuler, John H., 4,874,368, Cl. 604-82.000.
Micropolis Corporation: *See*—
Slezak, Arnold; and Levy, Lloyd, 4,875,117, Cl. 360-98.010.
Microwave Ovens Limited: *See*—
Eke, Kenneth I, 4,874,914, Cl. 219-10.55M.
Migozzi, Jean-Blaise: *See*—
Cheysson, Francoise; and Migozzi, Jean-Blaise, 4,874,214, Cl. 350-3.700.
Migrin, Robert: *See*—
Gutman, Robert F.; and Migrin, Robert, 4,874,224, Cl. 350-174.000.
Mihayashi, Keiji: *See*—
Yamanouchi, Junichi; Ono, Shigetoshi; Hirano, Tsumoru; Watanabe, Toshiyuki; Sakai, Nobuo; and Mihayashi, Keiji, 4,874,689, Cl. 430-548.000.
Mihelich, Edward D.: *See*—
Bonjouklian, Rosanne; Meade, Christopher J. M.; Mihelich, Edward D.; and Phillips, Michael L., 4,874,782, Cl. 514-473.000.
Mikami, Mitsugu: *See*—
Kobayashi, Osamu; Yukimoto, Koji; and Mikami, Mitsugu, 4,874,347, Cl. 453-5.000.
Mikami, Naoko: *See*—
Higuchi, Ryoichi; Sakurai, Takao; Yokota, Tadahiko; Mikami, Naoko; Yamamoto, Eri; and Takeuchi, Koji, 4,874,542, Cl. 252-299.610.
Mikhlin, Josef A.; Capes, C. Edward; Divanji, Haresh S.; and Coleman, Richard D., to Canadian Patent and Development Ltd. Method of producing fuel of relatively higher calorific value from low rank and oxidized coal. 4,874,393, Cl. 44-20.000.
Mikkelsen, Alan R.: *See*—
Sortwell, Edwin T.; Slovinsky, Manuel; and Mikkelsen, Alan R., 4,874,588, Cl. 422-269.000.
Mileage Validator, Inc.: *See*—
Price, John W.; and Brady, John F., III, 4,875,167, Cl. 364-424.040.
Miller, Anton J.: *See*—
Koze, Jeffrey T.; and Miller, Anton J., 4,874,463, Cl. 156-645.000.
Miller, Curtis H.; Arenberg, I. Kaufman; and Altshuler, John H., to Micromedics, Inc. Fibrin glue delivery system. 4,874,368, Cl. 604-82.000.
Miller, Jack V.: *See*—
Miller, Ruth E.; and Miller, Jack V., 4,874,676, Cl. 428-542.200.
Miller, James G.; and Rabo, Jule A., to UOP. Cobalt Fischer-Tropsch catalysts having improved selectivity. 4,874,732, Cl. 502-74.000.
Miller, James G.; and Rabo, Jule A., to UOP. Cobalt Fischer-Tropsch catalysts having improved selectivity. 4,874,733, Cl. 502-74.000.
Miller, James G.: *See*—
Hunt, Thomas J.; Miller, James G.; Thomas, Lewis J., III; Melton, Hewlett E., Jr.; and Shoup, Thomas A., 4,873,984, Cl. 128-660.070.
Miller, Jeffrey L.: *See*—
Spaderna, Dieter W.; and Miller, Jeffrey L., 4,875,196, Cl. 365-238.000.
Miller, Kenneth L.: *See*—
Filippi, Ernest A.; and Miller, Kenneth L., 4,875,031, Cl. 340-605.000.
Miller, Lawrence G. Container opening device. 4,874,126, Cl. 229-160.200.
Miller, Richard A.: *See*—
Aho, Kenneth A.; Melby, Jeffrey J.; and Miller, Richard A., 4,874,228, Cl. 350-345.000.
Miller, Richard L.: *See*—
Kohler, Tilo, 4,874,472, Cl. 202-169.000.
Miller, Ruth E.; and Miller, Jack V. Sculpture having simulated hair. 4,874,676, Cl. 428-542.200.
Millipore Corporation: *See*—
Lopatin, George; Yen, Larry Y.; and Rogers, Randall R., 4,874,567, Cl. 264-45.100.
Milton, David W., to Cintas Corporation. Apparatus for inspecting and hangering pants. 4,873,878, Cl. 73-865.800.
Minami, Syuji; Kawamoto, Keiji; Kasai, Tetsuji; Kuroiwa, Toshiaki; and Todo, Akira. Cycloolefin type random copolymer compositions and uses thereof. 4,874,808, Cl. 524-291.000.
Minamisawa, Tsuyoshi; Endo, Katsunori; Ikegami, Eitaro; and Nezu, Shigeru, to Polyplastics Co., Ltd. Polyester resin composition. 4,874,800, Cl. 523-205.000.
Mine, Kazuhiro; Sanada, Kei; and Ide, Mitsuteru, to NEC Corporation. Laminated mechanical amplification mechanism for piezoelectric elements. 4,874,980, Cl. 310-328.000.
Miner, Jay G.; Dean, Dave; Decuir, Joseph C.; Nicholson, Ronald H.; and Tanaka, Akio, to Commodore-Amiga, Inc. Personal computer apparatus for block transfer of bit-mapped image data. 4,874,164, Cl. 273-1.00E.
Minhas, Bhupender S., to W. R. grace & Co.-Conn. Coupling fluid separation membrane elements. 4,874,405, Cl. 55-158.000.
Minnesota Mining and Manufacturing Company: *See*—
Aho, Kenneth A.; Melby, Jeffrey J.; and Miller, Richard A., 4,874,228, Cl. 350-345.000.
Froelich, Harold E.; and Foslien, Floyd L., 4,874,122, Cl. 227-19.000.
Hanson, Robert L., 4,875,109, Cl. 360-60.000.
Jacobson, Richard L.; Jeffrey, Frank R.; and Westerberg, Roger K., 4,874,631, Cl. 427-39.000.
Johansson, Ronald C., 4,874,908, Cl. 174-72.00A.
Leonard, Vurnen; Kato, Arthur K.; Ohmori, Kiyoshi; Fujiwara, Keisuke; and Soda, Yutaka, 4,875,128, Cl. 360-133.000.
Rasmussen, Jerald K.; Heilmann, Steven M.; Krepski, Larry R.; and Moren, Dean M., 4,874,822, Cl. 525-279.000.
Reed, John F.; and Jones, Marvin E., 4,874,399, Cl. 55-2.000.
Minolta Camera Kabushiki Kaisha: *See*—
Murasaki, Sadanobu; and Makiyama, Hiroyuki, 4,874,161, Cl. 271-265.000.
Nakajima, Akio, 4,875,173, Cl. 364-518.000.
Minoura, Jun: *See*—
Ito, Toshiyasu; Minoura, Jun; Mori, Takaaki; Takahashi, Shigeyuki; Kato, Mamoru; Shimada, Junichi; and Hayakawa, Fujio, 4,874,229, Cl. 350-357.000.
Minuhin, Vadim B.; Berzon, Evgeny J.; and VonDeylen, Vernon F., to Magnetic Peripherals Inc. Phase lock loop. 4,875,108, Cl. 360-51.000.
Mio, Kohei: *See*—
Ochi, Tatsuyuki; Tanaka, Nobuo; and Mio, Kohei, 4,874,238, Cl. 356-1.000.
Mirenna, Luigi: *See*—
Menconi, Augusto; Camaggi, Giovanni; Gozzo, Franco; Mirenna, Luigi; and Garavaglia, Carlo, 4,874,786, Cl. 514-528.000.
Mise, Takaya: *See*—
Miya, Shinya; Harada, Masato; Mise, Takaya; and Yamazaki, Hiroshi, 4,874,880, Cl. 556-53.000.
Mishima, Yasunobu: *See*—
Kubo, Eiichi; Nagaoka, Koichi; Miyahara, Yoshiki; Kiriyama, Syunichi; and Mishima, Yasunobu, 4,874,666, Cl. 428-398.000.
Misumi, Kiyohito: *See*—
Furukawa, Mitsuhiko; Kitahira, Takashi; Tanaka, Sakae; and Misumi, Kiyohito, 4,874,725, Cl. 501-89.000.
Misumi, Shikao: *See*—
Ichikawa, Katumi; Amano, Itaru; Hujieda, Yasuhiko; Misumi, Shikao; Hukumura, Seisuke; and Miyauchi, Hideo, 4,874,303, Cl. 425-28.100.
Mita Industrial Co., Ltd: *See*—
Takamatsu, Junichi; and Akiyama, Kazunori, 4,875,077, Cl. 355-212.000.
Mitchell, Maurice E. Microcomputer with disconnected, open, independent, bimemory architecture, allowing large interacting, interconnected multi-microcomputer parallel systems accomodating multiple levels of programmer defined heirarchy. 4,875,154, Cl. 364-206.000.
Mitchell, Peter W. D., to Union Camp Corporation. Preparation of pseudoionones. 4,874,900, Cl. 568-390.000.
Mitchell, Tonia L. Infant care apron. 4,873,725, Cl. 2-48.000.
Mitsubishi Denki K.K.: *See*—
Ishikawa, Norio, 4,874,907, Cl. 174-68.500.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Inoue, Yasuo, 4,874,718, Cl. 437-62.000.
Kato, Kiyotaka; and Oshima, Michitaka, 4,875,033, Cl. 340-706.000.
Kobayashi, Norihide; Inaba, Tsutomu; Kimura, Tadashi; and Sugihara, Masahiro, 4,874,302, Cl. 418-55.000.
Matsuyama, Jiro, 4,873,888, Cl. 74-574.000.
Ueyama, Yoshiji; and Asayama, Yoshiaki, 4,873,957, Cl. 123-399.000.
Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Kushibe, Yuki; and Sato, Hiroshi, 4,874,309, Cl. 425-589.000.
Mitsubishi Kinzoku Kabushiki Kaisha: *See*—
Akutsu, Hidetoshi, 4,874,439, Cl. 148-433.000.
Wakita, Saburo; and Hoshi, Junji, 4,874,577, Cl. 420-417.000.
Mitsubishi Paper Mills, Ltd.: *See*—
Hiraishi, Shigetoshi; Koike, Naomasa; Kondo, Kazuyoshi; and Fuchigami, Mitsuru, 4,874,740, Cl. 503-201.000.

Mitsubishi Petrochemical Co., Ltd.: *See*—
Oda, Kyoko; Takahasi, Kunimasa; and Seo, Iwao, 4,874,598, Cl. 423-598.000.
Mitsubishi Rayon Co., Ltd.: *See*—
Kato, Masaaki; Uno, Tetsuya; Kobayashi, Masao; and Osuga, Naoto, 4,874,890, Cl. 560-205.000.
Sugimori, Teruhiko; Suzuki, Fumio; Habara, Hideaki; and Inada, Hiromasa, 4,874,841, Cl. 528-491.000.
Mitsui Petrochemical Industries, Inc.: *See*—
Yatsu, Tadao; and Akana, Yoshinori, 4,874,647, Cl. 428-35.700.
Mitsui Petrochemical Industries, Ltd.: *See*—
Kioka, Mamoru; and Kashiwa, Norio, 4,874,734, Cl. 502-104.000.
Mittelbach, Helmut, to Haver & Boecker. Arrangement for fitting valve sacks on filling pipe of packaging machine. 4,873,816, Cl. 53-573.000.
Miya, Shinya; Harada, Masato; Mise, Takaya; and Yamazaki, Hiroshi, to Chisso Corporation; and Institute of Physical & Chemical Research, The. Bis(di-, tri- or tetra-substituted-cyclopentadienyl)-zirconium dihalides. 4,874,880, Cl. 556-53.000.
Miyabayashi, Takeshi, to Brother Kogyo Kabushiki Kaisha. Method of making thin film magnetic recording medium. 4,874,637, Cl. 427-131.000.
Miyagawa Kasei Industry Co., Ltd.: *See*—
Miyagawa, Shiro, 4,874,679, Cl. 429-91.000.
Miyagawa, Shiro, to Miyagawa Kasei Industry Co., Ltd. Storage battery with indicating device. 4,874,679, Cl. 429-91.000.
Miyagi, Mitsunobu: *See*—
Hongo, Akihito; Shiota, Tsuneo; Nishida, Shigeo; Miyagi, Mitsunobu; and Wagatsuma, Yoshihiko, 4,875,218, Cl. 372-64.000.
Miyahara, Yoshiki: *See*—
Kubo, Eiichi; Nagaoka, Koichi; Miyahara, Yoshiki; Kiriyama, Syunichi; and Mishima, Yasunobu, 4,874,666, Cl. 428-398.000.
Miyake, Akira: *See*—
Asada, Seiichi; Sueyoshi, Toshinobu; and Miyake, Akira, 4,874,668, Cl. 428-403.000.
Miyake, Hitomi: *See*—
Tamba, Shinichi; and Miyake, Hitomi, 4,873,945, Cl. 123-55.00R.
Miyake, Nobuhiko: *See*—
Sato, Isao; Miyake, Nobuhiko; and Nishida, Souji, 4,874,259, Cl. 384-445.000.
Miyamaru, Tsuneo, to Toyota Jidosha Kabushiki Kaisha. Coolant outlet element for use in cooling system of internal combustion engine. 4,874,254, Cl. 374-208.000.
Miyamoto, Hisashi: *See*—
Ueda, Hiraki; Miyamoto, Hisashi; Aki, Shinji; and Otsuka, Tatsuya, 4,874,764, Cl. 514-254.000.
Miyamoto, Masayoshi: *See*—
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.
Miyamoto, Ryouichi: *See*—
Imamura, Makoto; and Miyamoto, Ryouichi, 4,874,086, Cl. 206-330.000.
Miyashita, Kunio: *See*—
Kimura, Hiroshi; Naito, Shotaro; Miyashita, Kunio; Noto, Yasuo; Sugiura, Noboru; Takahashi, Tadashi; Yamamura, Hirohisa; Yamashita, Seizi; Kawamata, Syooichi; Tajima, Fumio; and Horikoshi, Shigeru, 4,874,053, Cl. 180-79.100.
Miyata, Hiroshi: *See*—
Sakurai, Shigeo; Umezawa, Sadao; Usami, Saburo; Miyata, Hiroshi; Toriya, Hajime; Tsubouchi, Kuniyoshi; and Kaneko, Ryoichi, 4,875,170, Cl. 364-507.000.
Miyauchi, Akira; Nishimoto, Hiroshi; Okiyama, Tadashi; Kitasagami, Hiroo; Sugimoto, Masahiro; Tamada, Haruo; and Emori, Shinji, to Fujitsu Limited. Integrated circuit device having strip line structure therein. 4,875,087, Cl. 357-71.000.
Miyauchi, Hideo: *See*—
Ichikawa, Katumi; Amano, Itaru; Hujieda, Yasuhiko; Misumi, Shikao; Hukumura, Seisuke; and Miyauchi, Hideo, 4,874,303, Cl. 425-28.100.
Miyauchi, Shizuya; and Wada, Kiyoshi, to Koito Seisakusho Co., Ltd. Headlight for vehicle. 4,875,141, Cl. 362-61.000.
Miyazaki, Satoshi: *See*—
Furuhashi, Koshi; Miyazaki, Satoshi; Furuya, Masakazu; Kawatobi, Tatsuo; Kouyama, Sinichi; and Kashio, Jiro, 4,875,208, Cl. 370-94.100.
Mizumura, Shunji: *See*—
Kawai, Osamu; and Mizumura, Shunji, 4,874,995, Cl. 318-484.000.
Mizuno, Hirotaka: *See*—
Maeda, Akira; Sano, Koichi; Yokoyama, Tetsuo; Koizumi, Hideaki; and Mizuno, Hirotaka, 4,875,012, Cl. 324-309.000.
Mizushima, Yoshihiko: *See*—
Koishi, Musubu; Mizushima, Yoshihiko; and Kan, Hirofumi, 4,875,093, Cl. 358-83.000.
Mizutani, Morikazu: *See*—
Sootome, Sumitoshi; Mizutani, Morikazu; Ikemoto, Isao; Kanemitsu, Shinji; Kitajima, Hajime; and Onoda, Shigeyoshi, 4,875,075, Cl. 355-50.000.
Moak, Jonathan E.: *See*—
Resch, William A., III; and Moak, Jonathan E., 4,875,078, Cl. 355-246.000.
Mobay Corporation: *See*—
Lundy, Charles E.; Krishnan, Sivaram; and Reinert, Gerard E., 4,874,802, Cl. 524-94.000.
Mobil Oil Corporation: *See*—
Bartilucci, Mark P.; Karsner, Grant G.; and Tracy, William J., III, 4,874,505, Cl. 208-131.000.
Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., 4,874,503, Cl. 208-67.000.
von Ballmoos, Roland; and Ryan, Francis X., 4,874,504, Cl. 208-111.000.
Mochimaru, Hideaki: *See*—
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.
Mochizuki, Eiichi: *See*—
Kubodera, Takayuki; Nakamura, Shizuo; Onizawa, Masanori; Shiroshita, Hirotaka; Mochizuki, Eiichi; Tsujimura, Masao; Atsuta, Toshikatsu; and Morooka, Takayoshi, 4,875,065, Cl. 354-82.000.
Moeller, Hinrich: *See*—
Schmid, Karl-Heinz; Penninger, Josef; and Moeller, Hinrich, 4,874,579, Cl. 422-16.000.
Mohan, Robert J.; and O'Neil, Walter K., to Eaton Corporation. Viscous fan drive control with integrated speed sensor. 4,874,072, Cl. 192-58.00B.
Mohr, Kristine: *See*—
Yong, Bak G.; Petra, Barth; Dietrich, Demus; Detlev, Joachimi; Kampa, Barbara; Kohler, Saskia; Mohr, Kristine; Paschke, Reinhard; Pelzl, Gerhard; Rosenfeld, Ulrich; Schafer, Wolfgang; Scherf, Klaus-Dieter; Tschirske, Carsten; Weissflog, Wolfgang; and Zaschke, Horst, 4,874,544, Cl. 252-299.610.
Mohrmann, Karl-Heinrich: *See*—
Gallenkamp, Bernd; Gunther, Andreas; Mohrmann, Karl-Heinrich; and Schmidt, Thomas, 4,874,860, Cl. 544-221.000.
Mol, Vernon J., III: *See*—
Mulder, Merle W.; and Mol, Vernon J., III, 4,874,112, Cl. 221-1.000.
Moldex/Metric Products, Inc.: *See*—
Magidson, Mark; and Huber, Otto L., 4,873,972, Cl. 128-206.120.
Moll, Maurice M.: *See*—
Ellsworth, Daniel L.; and Moll, Maurice M., 4,875,151, Cl. 363-127.000.
Momiyama, Yoshiharu: *See*—
Maeno, Mikihiko; Ohta, Yukio; Momiyama, Yoshiharu; Ono, Hisao; Takahata, Katsumasa; Ozono, Kazuyuki; Shimizu, Makoto; and Yamamoto, Mikio, 4,874,159, Cl. 271-171.000.
Momodomi, Masaki; and Sakui, Koji, to Kabushiki Kaisha Toshiba. Semiconductor device with a reference voltage generator. 4,875,195, Cl. 365-230.080.
Monfort, Jean-Jacques. Processing system for a gambling game. 4,875,164, Cl. 364-412.000.
Monroe, Letcher: *See*—
McCall, Jones; McClure, Tom; and Monroe, Letcher, 4,874,263, Cl. 400-241.300.
Monsanto Company: *See*—
Cartier, George E.; and Farmer, Peter H., 4,874,814, Cl. 525-61.000.
Schwier, Chris E.; and Wu, Wan C., 4,874,829, Cl. 526-262.000.
Monson, Mark B.; Blandino, Thomas P.; Bahr, Dennis E.; and Post, Kendall E., to Bahr Technologies, Inc. Receiver preamplifier with tuned circuit adapted for Loran reception. 4,875,019, Cl. 330-302.000.
Montagu, Jean I., to General Scanning, Inc. Tunable resonant mechanical system. 4,874,215, Cl. 350-6.600.
Montedipe S.p.A.: *See*—
Comper, Lucia; and Ferrari, Francesco, 4,874,307, Cl. 425-311.000.
Montedison S.p.A.: *See*—
Fiore, Leonardo; Motroni, Giuseppe; and Maritano, Mauro, 4,874,838, Cl. 528-408.000.
Johns, Ken W. E.; Briggs, Stuart; and Flabbi, Luciano, 4,874,124, Cl. 228-180.100.
Menconi, Augusto; Camaggi, Giovanni; Gozzo, Franco; Mirenna, Luigi; and Garavaglia, Carlo, 4,874,786, Cl. 514-528.000.
Montefiore Hospital Association of Western Pennsylvania: *See*—
Stanko, Ronald T., 4,874,790, Cl. 514-557.000.
Monti, Marco M.: *See*—
Daniele, Vincenzo; Monti, Marco M.; Taliercio, Michele; and Capocelli, Piero, 4,875,020, Cl. 330-307.000.
Montoya, Wayne; and Reamey, Robert H., to Raychem Corporation. Stabilization of poly(arylene ether ketones). 4,874,839, Cl. 528-480.000.
Moore, James G. Collapsible electric guitar. 4,873,908, Cl. 84-291.000.
Moore, Thomas C., Jr.: *See*—
Holmes, Harlan K.; Moore, Thomas C., Jr.; and Fantl, Andrew J., 4,873,990, Cl. 128-748.000.
Moran, John P.; Gilson, Richard W.; and Heubel, Thomas W., to Sherwood Medical Company. Plunger lock device. 4,874,385, Cl. 604-208.000.
Moren, Dean M.: *See*—
Rasmussen, Jerald K.; Heilmann, Steven M.; Krepski, Larry R.; and Moren, Dean M., 4,874,822, Cl. 525-279.000.
Mori, Masaharu, to Clarion Co., Ltd. Spread spectrum receiver. 4,875,221, Cl. 375-1.000.
Mori, Shinsaku: *See*—
Kikuchi, Makoto; Mori, Shinsaku; Nikawa, Yoshio; and Terakawa, Takashige, 4,873,995, Cl. 128-804.000.

Mori, Takaaki: *See*—
Ito, Toshiyasu; Minoura, Jun; Mori, Takaaki; Takahashi, Shigeyuki; Kato, Mamoru; Shimada, Junichi; and Hayakawa, Fujio, 4,874,229, Cl. 350-357.000.
Mori, Yoshiteru: *See*—
Ohnishi, Kazuyuki; Mori, Yoshiteru; and Okuda, Masakiyo, 4,875,072, Cl. 355-23.000.
Moriconi, Andrea: *See*—
Crispoldi, Antonio; Moriconi, Andrea; and Chiappafreddo, Mario, 4,874,595, Cl. 423-397.000.
Morie, Satsuki: *See*—
Wakabayashi, Ataru; Umehara, Yohichi; Morie, Satsuki; Kuwahara, Ikuro; and Okada, Yoshimi, 4,874,483, Cl. 204-94.000.
Morita, Kiyomi: *See*—
Kamifuji, Hiroshi; Tanabe, Yoshiyuki; and Morita, Kiyomi, 4,873,960, Cl. 123-480.000.
Moriuchi, Yousuke: *See*—
Kousai, Tadashi; Ishida, Toshinobu; and Moriuchi, Yousuke, 4,874,374, Cl. 604-164.000.
Moriya, Tomoyuki: *See*—
Suzuki, Takami; Tatara, Yoshikuni; and Moriya, Tomoyuki, 4,874,264, Cl. 400-335.000.
Morooka, Takayoshi: *See*—
Kubodera, Takayuki; Nakamura, Shizuo; Onizawa, Masanori; Shiroshita, Hirotaka; Mochizuki, Eiichi; Tsujimura, Masao; Atsuta, Toshikatsu; and Morooka, Takayoshi, 4,875,065, Cl. 354-82.000.
Morris, David L.; Filip, Mihail; D'Amelio, Frank D.; Esposito, Dominick G.; and Quint, Robert H., to Circon Corporation. Inspection instrument channel aspirator and pressure neutralizing device. 4,874,364, Cl. 604-35.000.
Morrison, Judith A. Examination garment. 4,873,982, Cl. 128-630.000.
Morrison Textile Machinery Company: *See*—
Talbert, James E., Jr., 4,873,846, Cl. 68-5.00E.
Morse, John E.: *See*—
Daniels, Steven D.; Maslanka, Daniel C.; and Morse, John E., 4,875,122, Cl. 360-109.000.
Mossadegh, Reza: *See*—
Vacha, Lubos J. B.; Schultz, Peter C.; Moynihan, Cornelius T.; Raychaudhuri, Satyabrata; Cadien, Ken C.; Harbison, Barry B.; and Mossadegh, Reza, 4,874,222, Cl. 350-96.340.
Moteki, Eiji, to Fuji Electric Company Ltd. System for detecting a reference track on a disk surface in a disc storage unit. 4,875,114, Cl. 360-77.080.
Motohashi, Takeshi: *See*—
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.
Motohiro, Tomoyoshi: *See*—
Hamaguchi, Shigeki; Ohtsuka, Yasuhiro; Motohiro, Tomoyoshi; Taga, Yasunori; and Ishii, Masahiko, 4,874,664, Cl. 428-325.000.
Motorola, Inc.: *See*—
Bai, Monty W.; and Huhmann, Douglas J., 4,873,871, Cl. 73-777.000.
Siwiak, Kazimierz; Jasinski, Leon; and Steel, Francis R., 4,875,038, Cl. 340-825.440.
Motroni, Giuseppe: *See*—
Fiore, Leonardo; Motroni, Giuseppe; and Maritano, Mauro, 4,874,838, Cl. 528-408.000.
Moulds, Julie M., to Chrysler Motors Corporation. Shipping rack for vehicle air dams. 4,874,098, Cl. 211-13.000.
Moya, Edward J.: *See*—
Kay, Nathan; McNab, Donald W.; and Moya, Edward J., 4,874,117, Cl. 222-487.000.
Moynihan, Cornelius T.: *See*—
Vacha, Lubos J. B.; Schultz, Peter C.; Moynihan, Cornelius T.; Raychaudhuri, Satyabrata; Cadien, Ken C.; Harbison, Barry B.; and Mossadegh, Reza, 4,874,222, Cl. 350-96.340.
Moynihan, Patrick B. Compressor attachment for portable drill. 4,874,296, Cl. 417-234.000.
MRE Corporation: *See*—
Fergison, Hugo S., 4,874,644, Cl. 148-12.00R.
Mrozik, Helmut, to Merck & Co., Inc. 4"-Deoxy-4-N-methylamino avermectin Bla/Blb. 4,874,749, Cl. 514-30.000.
MTU Motoren-und Turbinen-Union Munchen GmbH: *See*—
Grieb, Hubert, 4,874,287, Cl. 415-149.200.
Mulder, Merle W.; and Mol, Vernon J., III. Filter dispenser. 4,874,112, Cl. 221-1.000.
Mulder, Theodor; and Swartz, Ronald W., to Intel Corporation. Integrated read and programming row driver. 4,875,191, Cl. 365-189.010.
Mulhaupt, Rolf; and Simon, Hubert, to Ciba-Geigy Corporation. Novel oxazolidines. 4,874,805, Cl. 524-188.000.
Muller-Beckmann, Bernd: *See*—
Mertens, Alfred; von der Saal, Wolfgang; Berger, Herbert; Muller-Beckmann, Bernd; and Strein, Klaus, 4,874,756, Cl. 514-212.000.
Muller, Gunter; Nagel, Rolf; and Stahli, Jurg, to Metallogal AG. Single-component polyrethane coating mass. 4,874,812, Cl. 524-712.000.
Muller, Heinz, to Reifenhauser GmbH & Co. Maschinenfabrik. Apparatus for calendering plastic web extruded from a slot die. 4,874,571, Cl. 264-175.000.
Multi-Technology Inc.: *See*—
Jessop, Paul M.; and Jeffs, David H., 4,874,102, Cl. 215-273.000.
Multinorm B.V.: *See*—
Wondergem, Jan, 4,874,130, Cl. 239-63.000.
Munro, Murray H. G.; Perry, Nigel B.; and Blunt, John W., to Harbor Branch Oceanographic Institution, Inc. Discorhabdin D, compositions containing same and methods of preparatio and use thereof. 4,874,767, Cl. 514-278.000.
Munroe, Ronald G., to Eagle Electric Manufacturing Co., Inc. Electrical plugs and connectors with automatic cord clamps. 4,874,332, Cl. 439-462.000.
Murai, Katsumi; and Usui, Makoto, to Matsushita Electric Industrial Co., Ltd. Galois field arithmetic logic unit. 4,875,211, Cl. 371-40.100.
Murakami, Hideo, to Ryobi, Ltd. Bail for spinning reel. 4,874,144, Cl. 242-235.000.
Murakami, Hitomi: *See*—
Matsumoto, Shuichi; and Murakami, Hitomi, 4,875,095, Cl. 358-133.000.
Murakami, Kazuo; Kaneko, Yasutoshi; and Tamaki, Takasi, to Yamaha Corporation. Automatic player piano. 4,873,905, Cl. 84-20.000.
Murakami, Michiyuki: *See*—
Yamada, Ichiji; Inuzuka, Yutake; Ichihara, Isao; Murakami, Michiyuki; Suzuki, George; Yanahashi, Ryou; and Kondo, Takeshi, 4,873,884, Cl. 74-473.00P.
Murakami, Yoshiki; Yamamoto, Etsuji; Yabusaki, Masao; and Kohno, Hideki, to Hitachi, Ltd. High-frequency coil for nuclear magnetic imaging. 4,875,013, Cl. 324-318.000.
Murakosi, Masanobu: *See*—
Masuda, Yoshihiko; and Murakosi, Masanobu, 4,874,437, Cl. 148-150.000.
Muranaka, Shigeo; Ohkawa, Kouzaburou; Yokoyama, Junichi; Matayoshi, Yutaka; and Kamegaya, Shigeru, to Nissan Motor Co., Ltd. Induction port arrangement for internal combustion engine having multiple inlet valves per combustion chamber. 4,873,953, Cl. 123-308.000.
Murasaki, Sadanobu; and Makiyama, Hiroyuki, to Minolta Camera Kabushiki Kaisha. Sheet transporting apparatus. 4,874,161, Cl. 271-265.000.
Murashige, Shinichi: *See*—
Nakamura, Hideaki; Shimamori, Tamotsu; and Murashige, Shinichi, 4,875,016, Cl. 328-26.000.
Murata Manufacturing Co., Ltd.: *See*—
Sano, Harunobu; Sakabe, Yukio; and Nishioka, Goro, 4,875,136, Cl. 361-321.000.
Murotani, Tatsunori, to NEC Corporation. Semiconductor memory device with protection cells. 4,875,194, Cl. 365-210.000.
Murphy, Margaret H.: *See*—
Thompson, Marvin W.; Jennings, Timothy C.; Scott, James A.; Phenicie, Ronald W.; Murphy, Margaret H.; Nakash, Gabriel D.; Biggers, James R.; Boudreau, Lynniee M.; and Curiel Contreras, Jorge H., 4,874,266, Cl. 403-407.100.
Murray, Theodore L., to Chrysler Motors Corporation. Dual evaporator air conditioner. 4,873,837, Cl. 62-199.000.
Muto, Tadanobu: *See*—
Kashiwada, Ken; Muto, Tadanobu; and Sasaki, Tetsuo, 4,874,035, Cl. 165-38.000.
Mutschler, Ernst: *See*—
Hofmann, Ingrid; Mutschler, Ernst; and Christner, Angelika, 4,874,763, Cl. 514-249.000.
Myers, David W.: *See*—
Watts, Michael P. C.; Perera, Thiloma I.; Myers, David W.; Ozarski, Robert G.; Schipper, John F.; and Tan, Raul V., 4,874,240, Cl. 356-73.000.
Myers, Michael L.: *See*—
Featherstone, John D. B.; Cooper, Lyndon F.; Myers, Michael L.; and Nelson, Dennis G. A., 4,874,315, Cl. 433-215.000.
Myers, Terry N.: *See*—
Baron, Arthur L.; Myers, Terry N.; and Wicher, Jerome, 4,874,803, Cl. 524-94.000.
Naganawa, Kazutomo: *See*—
Oku, Seiji; Shimamura, Tooru; Naganawa, Kazutomo; and Tanamura, Toshiya, 4,875,042, Cl. 340-870.170.
Nagano, Hiroyuki: *See*—
Kakuta, Toshio; and Nagano, Hiroyuki, 4,874,912, Cl. 200-16.00D.
Nagano, Masashi, to Shimano Industrial Company Limited. Pedal for a bicycle. 4,873,890, Cl. 74-594.400.
Nagaoka, Koichi: *See*—
Kubo, Eiichi; Nagaoka, Koichi; Miyahara, Yoshiki; Kiriyama, Syunichi; and Mishima, Yasunobu, 4,874,666, Cl. 428-398.000.
Nagasaki, Tatsuo: *See*—
Yamada, Hidetoshi; and Nagasaki, Tatsuo, 4,875,091, Cl. 358-42.000.
Nagashima, Michiyoshi: *See*—
Takamura, Yoshinari; Obara, Kazuaki; and Nagashima, Michiyoshi, 4,875,203, Cl. 369-46.000.
Nagatome, Yoshiaki: *See*—
Sengoku, Koji; and Nagatome, Yoshiaki, 4,874,630, Cl. 426-634.000.
Nagayama, Susumu: *See*—
Yamazaki, Shunpei; Itoh, Kenji; and Nagayama, Susumu, 4,874,920, Cl. 219-121.850.
Nagel, Rolf: *See*—
Muller, Gunter; Nagel, Rolf; and Stahli, Jurg, 4,874,812, Cl. 524-712.000.
Nageno, Koji: *See*—
Kamon, Yoshiyuki; Ogiwara, Akira; and Nageno, Koji, 4,874,316, Cl. 439-39.000.

Nagl, Michael: *See*—
Papst, Gero; and Nagl, Michael, 4,874,037, Cl. 165-47.000.

Nagy, Michael A.: *See*—
Boyle, Peter C.; Steffen, Daniel G.; Melton, John L.; Coccodrilli, Gus D., Jr.; and Nagy, Michael A., 4,874,606, Cl. 426-74.000.

Naito, Genpei, to Nissan Motor Company, Limited. Driving force distribution control system for a 4 wheel drive vehicle. 4,874,056, Cl. 180-233.000.

Naito, Sakae: *See*—
Tsuchitani, Masatoshi; and Naito, Sakae, 4,874,502, Cl. 208-45.000.

Naito, Shotaro: *See*—
Kimura, Hiroshi; Naito, Shotaro; Miyashita, Kunio; Noto, Yasuo; Sugiura, Noboru; Takahashi, Tadashi; Yamamura, Hirohisa; Yamashita, Seizi; Kawamata, Syooichi; Tajima, Fumio; and Horikoshi, Shigeru, 4,874,053, Cl. 180-79.100.

Naito, Takayuki: *See*—
Iimura, Seiji; Abe, Yoshio; Okumura, Jun; Naito, Takayuki; and Kamachi, Hajime, 4,874,856, Cl. 540-222.000.

Nakagawa, Yoshitomo; and Yamaoka, Takehiro, to Seiko Instruments Inc. Method and apparatus for modifying patterned film. 4,874,460, Cl. 156-626.000.

Nakagawa, Yoshitomo; Kaito, Takashi; Houjyo, Hisao; and Yamamoto, Masahiro, to Seiko Instruments, Inc. Process for forming pattern film. 4,874,632, Cl. 427-41.000.

Nakahama, Tadamitsu: *See*—
Matsui, Masataka; Aono, Toshiaki; Tanimoto, Yoshio; Nakahama, Tadamitsu; and Yamane, Takakazu, 4,874,639, Cl. 427-240.000.

Nakahara, Hiromi: *See*—
Okita, Tsutomu; Nakahara, Hiromi; and Ogawa, Hiroshi, 4,874,636, Cl. 427-130.000.

Nakahara, Jirou; Ueshin, Akito; and Okajima, Shiro, to Kabushiki Kaisha Toshiba. IC card which displays embossed information to prevent counterfeiting. 4,874,934, Cl. 235-492.000.

Nakai, Yasuhide: *See*—
Nishimoto, Yoshiro; Yoneda, Yasuji; Imaoka, Shinichi; Nakai, Yasuhide; Nakaue, Akimitsu; Onishi, Yoshihiko; Tachibana, Hiroyuki; Inoue, Takayoshi; Kusaka, Takuya; Takamatsu, Hiroyuki; Tojyo, Shigeki; Kajikawa, Hiroshi; and Nishimura, Kozo, 4,874,939, Cl. 250-211.00J.

Nakajima, Akio, to Minolta Camera Kabushiki Kaisha. Image enlarging method and device. 4,875,173, Cl. 364-518.000.

Nakajima, Hirotaka, to Kabushiki Kaisha Toshiba. Ultrasonic imaging apparatus utilizing doppler flow metering. 4,873,985, Cl. 128-661.090.

Nakajima, Hisashi: *See*—
Terada, Michimasa; and Nakajima, Hisashi, 4,875,005, Cl. 324-158.00F.

Nakakita, Shoji: *See*—
Kimura, Mitsuru; and Nakakita, Shoji, 4,874,721, Cl. 437-209.000.

Nakakoshi, Ichiro: *See*—
Hamasaki, Naotaka; Kawamura, Hirotaka; Ohtsu, Norio; Nakakoshi, Ichiro; Ataka, Kikuo; Oomori, Kiyosi; and Kouno, Masahiko, 4,874,882, Cl. 558-131.000.

Nakakusu, Tohru: *See*—
Umeda, Osamu; Nakakusu, Tohru; Sato, Makoto; and Shimazaki, Tatsuo, 4,875,064, Cl. 353-78.000.

Nakamichi Corporation: *See*—
Nakamichi, Niro, 4,875,126, Cl. 360-130.230.

Nakamichi, Niro, to Nakamichi Corporation. Stationary tape guide for a magnetic tape recorder. 4,875,126, Cl. 360-130.230.

Nakamura, Hideaki; Shimamori, Tamotsu; and Murashige, Shinichi, to Omron Tateisi Electronics Company. Transducer and related circuitry. 4,875,016, Cl. 328-26.000.

Nakamura, Kikuo, to Sigma, Incorporated. Reel tare fixing device and reel. 4,874,172, Cl. 273-143.00R.

Nakamura, Shigeo: *See*—
Yokoi, Takeshi; and Nakamura, Shigeo, 4,874,262, Cl. 400-216.100.

Nakamura, Shizuo: *See*—
Kubodera, Takayuki; Nakamura, Shizuo; Onizawa, Masanori; Shiroshita, Hirotaka; Mochizuki, Eiichi; Tsujimura, Masao; Atsuta, Toshikatsu; and Morooka, Takayoshi, 4,875,065, Cl. 354-82.000.

Nakane, Hideaki: *See*—
Yokosawa, Koichi; Yamamoto, Etsuji; Nakane, Hideaki; Yabusaki, Masao; and Ogura, Yukiko, 4,875,010, Cl. 324-248.000.

Nakanishi, Shigenori: *See*—
Takagaki, Hidetsugu; Abe, Masayoshi; Watanabe, Michihiro; Takeuchi, Kazuyuki; Nakanishi, Shigenori; Nakata, Yuuko; and Yamazaki, Keiji, 4,874,855, Cl. 540-3.000.

Nakash, Gabriel D.: *See*—
Thompson, Marvin W.; Jennings, Timothy C.; Scott, James A.; Phenicie, Ronald W.; Murphy, Margaret H.; Nakash, Gabriel D.; Biggers, James R.; Boudreau, Lynnlee M.; and Curiel Contreras, Jorge H., 4,874,266, Cl. 403-407.100.

Nakata, Jitsuo: *See*—
Shino, Masami; Takano, Hideaki; Nakata, Jitsuo; and Noro, Katsuhiko, 4,874,592, Cl. 423-262.000.

Nakata, Yuuko: *See*—
Takagaki, Hidetsugu; Abe, Masayoshi; Watanabe, Michihiro; Takeuchi, Kazuyuki; Nakanishi, Shigenori; Nakata, Yuuko; and Yamazaki, Keiji, 4,874,855, Cl. 540-3.000.

Nakaue, Akimitsu: *See*—
Nishimoto, Yoshiro; Yoneda, Yasuji; Imaoka, Shinichi; Nakai, Yasuhide; Nakaue, Akimitsu; Onishi, Yoshihiko; Tachibana, Hiroyuki; Inoue, Takayoshi; Kusaka, Takuya; Takamatsu, Hiroyuki; Tojyo, Shigeki; Kajikawa, Hiroshi; and Nishimura, Kozo, 4,874,939, Cl. 250-211.00J.

Nakazawa, Tsugio: *See*—
Kobayashi, Setsuo; Nakazawa, Tsugio; Yoshie, Yasumasa; Abiko, Yasushi; and Kameda, Kinya, 4,874,772, Cl. 514-341.000.

Nalco Chemical Company: *See*—
Meyer, George R., 4,874,395, Cl. 44-71.000.
Savino, Carolyn A., 4,874,466, Cl. 162-164.300.

Namiki, Masayuki; Gouda, Masanori; and Kamiya, Masaaki, to Seiko Instruments Inc. Magnetic sensor using integrated silicon Hall effect elements formed on the (100) plane of a silicon substrate. 4,875,011, Cl. 324-251.000.

Narita, Senichi: *See*—
Yamada, Shin-ichi; Goto, Takao; Mashiko, Toshihisa; Kogi, Kentaro; Oguchi, Yukiko; and Narita, Senichi, 4,874,760, Cl. 514-234.200.

Narita, Yoshinori; and Kawamura, Mitsuyoshi, to NGK Spark Plug Co., Ltd. Engine cylinder head with precombustion chambers using porous ceramics insert. 4,873,952, Cl. 123-270.000.

Narula, Dipak, to Dow Corning Corporation. Bi-modal silicone emulsions, silicone emulsification process and emulsions therefrom. 4,874,547, Cl. 252-312.000.

Nasu, Tetsuji; and Shiina, Jun, to Nissan Motor co., Ltd. Modular vehicle body. 4,874,200, Cl. 296-197.000.

National Electronics Warranty Corporation: *See*—
Schaufeld, Fredrick, 4,874,187, Cl. 283-70.000.

National Research Development Corporation: *See*—
Elliott, Michael; Janes, Norman F.; and Khambay, Bhupinder P. S., 4,874,781, Cl. 514-463.000.

National Semiconductor Corporation: *See*—
Huard, Jeff, 4,875,130, Cl. 361-56.000.
Meadows, William H., 4,874,969, Cl. 307-355.000.

National Starch and Chemical Corporation: *See*—
Brady, Francis X.; and Kauffman, Thomas F., 4,874,804, Cl. 524-100.000.
Eden, James L.; Kasica, James J.; and Zallie, James P., 4,874,628, Cl. 426-578.000.

Navarrini, Walter; and Desmarteu, Darryl D., to Ausimont S.r.l. Perfluoro-amino-oxaziridines. 4,874,875, Cl. 548-959.000.

Naville, Charles: *See*—
Guerendel, Philippe; Naville, Charles; Laurent, Jean; and Dedole, Pascal, 4,874,060, Cl. 181-102.000.

Navistar International Transportation Corp.: *See*—
Dannenberg, Robert D., 4,875,041, Cl. 340-870.130.

NCR Corporation: *See*—
Ellsworth, Daniel L.; and Moll, Maurice M., 4,875,151, Cl. 363-127.000.
Gioia, Samuel C., 4,874,713, Cl. 437-34.000.
Lyons, Dale R.; and Beam, Don E., 4,873,850, Cl. 70-85.000.
Porter, Warren W., 4,873,832, Cl. 62-49.200.

NEC Corporation: *See*—
Hara, Toshihiro; Yotsutani, Akio; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, 4,875,231, Cl. 379-61.000.
Kimura, Mitsuru; and Nakakita, Shoji, 4,874,721, Cl. 437-209.000.
Mine, Kazuhiro; Sanada, Kei; and Ide, Mitsuteru, 4,874,980, Cl. 310-328.000.
Murotani, Tatsunori, 4,875,194, Cl. 365-210.000.
Obara, Takashi, 4,875,189, Cl. 365-189.040.
Segawa, Machio, 4,875,193, Cl. 365-207.000.
Sonetaka, Noriyoshi, 4,875,021, Cl. 331-78.000.
Tohyama, Shigeru, 4,875,084, Cl. 357-30.000.
Yoshida, Yasuharu, 4,875,049, Cl. 341-159.000.

Nedelec, Lucien: *See*—
Nique, Francois; Nedelec, Lucien; Bouton, Marie-Madeleine; and Philibert, Daniel, 4,874,754, Cl. 514-178.000.

Nedoncelle, Philippe: *See*—
Shroot, Braham; Eustache, Jacques; Bernardon, Jean-Michel; and Nedoncelle, Philippe, 4,874,747, Cl. 514-23.000.

Negoro, Toshihito: *See*—
Takagi, Katsumi; Negoro, Toshihito; and Tamagawa, Itaru, 4,873,931, Cl. 112-121.110.

Nellums, Richard A.; and Braun, Eugene R., to Eaton Corporation. Control for AMT system start from stop operation. 4,874,070, Cl. 192-0.052.

Nelson, Bruce A.: *See*—
Fingerson, Conrad F.; Carlson, Dennis L.; Nelson, Bruce A.; and Eickhoff, Robert D., 4,874,180, Cl. 273-416.000.

Nelson, Dennis G. A.: *See*—
Featherstone, John D. B.; Cooper, Lyndon F.; Myers, Michael L.; and Nelson, Dennis G. A., 4,874,315, Cl. 433-215.000.

Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, to General Electric Company. Enhancing color stability to sterilizing radiation of polymer compositions. 4,874,783, Cl. 524-482.000.

Nelson, Loren D.; and Cerni, Todd A., to Ophir Corporation. Method of and apparatus for measuring vapor density. 4,874,572, Cl. 376-256.000.

Nepomuceno, Jose G.: *See*—
Tamol, Ronald A.; Nepomuceno, Jose G.; Keritsis, Gus D.; Burnett, George H.; Thesing, Richard A.; Winterson, Warren D.; and Nichols, Walter A., 4,874,000, Cl. 131-375.000.

Neppl, Franz; and Schwabe, Ulrich, to Siemens Aktiengesellschaft. Semiconductor circuit containing integrated bipolar and MOS transistors on a chip and method of producing same. 4,874,717, Cl. 437-59.000.

Nesse, Knut O., to Elopak Systems AG. Method in the production of a container, or a container blank, respectively, and a device for use with said method. 4,874,355, Cl. 493-148.000.

Neumann, Guenter J.: *See—*
Butterfield, Roger P.; Neumann, Guenter J.; and Wykstra, Curt A., 4,873,879, Cl. 74-689.000.

Neumiller, Phillip J.: *See—*
Etter, Robert M.; and Neumiller, Phillip J., 4,874,672, Cl. 428-457.000.

New, James Truitt, Jr. Kit for transporting all terrain vehicles. 4,874,284, Cl. 414-537.000.

Newell Co.: *See—*
Guinter, S. R., 4,874,148, Cl. 248-225.200.

Newell, David G.: *See—*
Featherstone, John L.; Spang, S. Timothy; Newell, David G.; and Gallup, Darrell L., 4,874,529, Cl. 210-713.000.

Newgard, Kent W.; and Gordon, Mark G., to Davis Newgard Revocable Family Living Trust, a part interest. Self-occluding intravascular cannula assembly. 4,874,377, Cl. 604-167.000.

Newman, Alec T.; Bentley, Andrew C.; King, Christine A.; MacMahon, Alistair J.; Tansley, Robert W.; and Gibbs, Andrew R., to General Foods Limited. Beverage preparing machines. 4,873,915, Cl. 99-289.00R.

Newman, Harold L.; Adams, William S., Jr.; and Boyden, Brace, to Boise Cascade Corporation. Pulp mill effluent color removal process. 4,874,521, Cl. 210-639.000.

Newman, Karel Z., Jr.: *See—*
Andrews, William H.; Brothers, Virginia M.; Files, James G.; Kuhn, Irene; McCaman, Michael T.; Paul, Leland S.; Sias, Stacey R.; Gore, Thomas C.; Newman, Karel Z., Jr.; and Tedesco, John L., 4,874,705, Cl. 435-252.330.

Neyret, Guy. Fork for the fixation of a cylinder lock plug. 4,873,852, Cl. 70-451.000.

Nezu, Shigeru: *See—*
Minamisawa, Tsuyoshi; Endo, Katsunori; Ikegami, Eitaro; and Nezu, Shigeru, 4,874,800, Cl. 523-205.000.

Ng, Yee S.: *See—*
Hediger, Edwin A.; Ng, Yee S.; and Pham, Hieu, 4,875,057, Cl. 346-107.00R.

NGK Insulators, Ltd.: *See—*
Kondo, Kuniharu, 4,874,516, Cl. 210-490.000.
Oda, Isao; and Soma, Takao, 4,874,674, Cl. 428-469.000.

NGK Spark Plug Co., Ltd.: *See—*
Narita, Yoshinori; and Kawamura, Mitsuyoshi, 4,873,952, Cl. 123-270.000.
Ohya, Kanji; Tsunooka, Tsutomu; Ogura, Koji; Ozeki, Hirofumi; and Yamamoto, Takashi, 4,874,727, Cl. 501-134.000.

Nguyen, Hoa T.: *See—*
Liapis, Athanasios I.; Findley, Marshall E.; and Nguyen, Hoa T., 4,874,524, Cl. 210-672.000.

Nicholas Marchiani Chatelain, Marie L.; and Pellini, Jean-Pierre. Rapid warmer for blood and blood products. 4,874,033, Cl. 165-1.000.

Nichols, Robert K.; and Roediger, Gary A., to American Telephone and Telegraph Comopany, AT&T Bell Laboratories. High bandwidth interleaved buffer memory and control. 4,875,206, Cl. 370-85.150.

Nichols, Walter A.: *See—*
Tamol, Ronald A.; Nepomuceno, Jose G.; Keritsis, Gus D.; Burnett, George H.; Thesing, Richard A.; Winterson, Warren D.; and Nichols, Walter A., 4,874,000, Cl. 131-375.000.

Nichols, Walter G. Foldable utility cabinet. 4,874,211, Cl. 312-269.000.

Nicholson, Ronald H.: *See—*
Miner, Jay G.; Dean, Dave; Decuir, Joseph C.; Nicholson, Ronald H.; and Tanaka, Akio, 4,874,164, Cl. 273-1.00E.

Nickel, Andreas: *See—*
Arlt, Dieter; Schwartz, Ulrich; Brandt, Hans-Walter; Arlt, Wolfgang; and Nickel, Andreas, 4,874,473, Cl. 203-1.000.

Nicolet Instrument Corporation: *See—*
Spencer, Robert B., 4,874,943, Cl. 250-281.000.

Niedringhaus, Joyce C.; and Lowry, Michael L., to Armco Inc. Fluidizing a lime-silica slag. 4,874,428, Cl. 75-30.000.

Nifco Inc.: *See—*
Akira, Mizusawa; and Kurihara, Kazumasa, 4,874,510, Cl. 210-172.000.
Iguchi, Tatsuya, 4,874,276, Cl. 411-48.000.

Nihon Den-Netsu Keiki Co., Ltd.: *See—*
Kondo, Kenshi, 4,874,081, Cl. 198-803.900.

Nihon Sinku Gijutsu Kabusiki Kaisha: *See—*
Okubo, Osamu; Kato, Takeo; and Tsushima, Tetsurou, 4,874,918, Cl. 219-85.110.

Nihon Tokkyo Kanri Company Limited: *See—*
Inagaki, Hiromichi, 4,874,257, Cl. 383-63.000.

Nikawa, Yoshio: *See—*
Kikuchi, Makoto; Mori, Shinsaku; Nikawa, Yoshio; and Terakawa, Takashige, 4,873,995, Cl. 128-804.000.

Nikon Corporation: *See—*
Aono, Yasuhiro, 4,874,231, Cl. 350-427.000.

Nilssen, Ole K. Electronic ballast unit with integral light sensor and circuit. 4,874,989, Cl. 315-151.000.

Nilsson, Bo, to Alfa-Laval Thermal AB. Plate heat exchanger. 4,874,039, Cl. 165-78.000.

Nippon Fine Chemical Co., Ltd.: *See—*
Kinomura, Keisuke; Kitazawa, Sadaya; Takata, Yasushi; and Sakakibara, Toshiyuki, 4,874,852, Cl. 536-18.600.

Nippon Mining Co., Ltd.: *See—*
Ogata, Takashi; Kato, Masanori; Kawasumi, Yoshio; Tominaga, Chikara; and Tanaka, Kanji, 4,874,436, Cl. 148-2.000.

Nippon Oil and Fats Co., Ltd.: *See—*
Yamamoto, Shosaku; Kakinuma, Kazuo; Ishioka, Hiroshi; Sodeyama, Fumio; Mayumi, Junji; and Maruta, Riichiro, 4,874,818, Cl. 525-183.000.

Nippon Seiko Kabushiki Kaisha: *See—*
Chikuma, Isamu; Shimada, Satoru; and Eda, Hiroshi, 4,874,183, Cl. 280-91.000.
Kawai, Osamu; and Mizumura, Shunji, 4,874,995, Cl. 318-484.000.
Sato, Isao; Miyake, Nobuhiko; and Nishida, Souji, 4,874,259, Cl. 384-445.000.
Tagawa, Kenichi, 4,874,073, Cl. 192-98.000.

Nippon Sheet Glass Co., Ltd.: *See—*
Funaki, Masaaki; Kunihiro, Koki; and Ichinomiya, Yutaka, 4,874,654, Cl. 428-192.000.
Kaite, Yoshikazu; and Yamagishi, Takashi, 4,874,414, Cl. 65-20.130.

Nippon Shinyaku Co., Ltd.: *See—*
Kimura, Kiyoshi; Ueda, Fusao; and Tamura, Masaru, 4,874,762, Cl. 514-242.000.
Ushimaru, Koichi; Hamakawa, Tomoaki; and Koga, Tomio, 4,874,774, Cl. 514-356.000.

Nippon Shoji Kabushiki Kaisha: *See—*
Hisaki, Masakatu; Kashima, Kenichi; Sakamoto, Yasuhiko; Hojo, Masakazu; Katayama, Osamu; and Hata, Hiroyoshi, 4,874,773, Cl. 514-355.000.

Nippon Telegraph & Telephone Corp.: *See—*
Hara, Toshihiro; Yotsutani, Akio; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, 4,875,231, Cl. 379-61.000.
Matsuoka, Morito; and Ono, Ken'ichi, 4,874,497, Cl. 204-298.000.

Nippon Tungsten Co., Ltd.: *See—*
Furukawa, Mitsuhiko; Kitahira, Takashi; Tanaka, Sakae; and Misumi, Kiyohito, 4,874,725, Cl. 501-89.000.

Nippondenso Co., Ltd.: *See—*
Okubo, Osamu; Kato, Takeo; and Tsushima, Tetsurou, 4,874,918, Cl. 219-85.110.

Nique, Francois; Nedelec, Lucien; Bouton, Marie-Madeleine; and Philibert, Daniel, to Roussel Uclaf. Novel 19-nor-steroids. 4,874,754, Cl. 514-178.000.

Nishida, Shigeo: *See—*
Hongo, Akihito; Shiota, Tsuneo; Nishida, Shigeo; Miyagi, Mitsunobu; and Wagatsuma, Yoshihiko, 4,875,218, Cl. 372-64.000.

Nishida, Souji: *See—*
Sato, Isao; Miyake, Nobuhiko; and Nishida, Souji, 4,874,259, Cl. 384-445.000.

Nishii, Michiharu; Ando, Masamoto; and Tada, Yoshihiko, to Aisin Seiki Kabushiki Kaisha. Hydraulic braking system for an automotive vehicle. 4,874,207, Cl. 303-52.000.

Nishimoto, Hiroshi: *See—*
Miyauchi, Akira; Nishimoto, Hiroshi; Okiyama, Tadashi; Kitasagami, Hiroo; Sugimoto, Masahiro; Tamada, Haruo; and Emori, Shinji, 4,875,087, Cl. 357-71.000.

Nishimoto, Yoshiro; Yoneda, Yasuji; Imaoka, Shinichi; Nakai, Yasuhide; Nakaue, Akimitsu; Onishi, Yoshihiko; Tachibana, Hiroyuki; Inoue, Takayoshi; Kusaka, Takuya; Takamatsu, Hiroyuki; Tojyo, Shigeki; Kajikawa, Hiroshi; and Nishimura, Kozo, to Kabushiki Kaisha Kobe Seiko Sho. Method and apparatus for detecting position/variance of input light using linear and quadratic outputs. 4,874,939, Cl. 250-211.00J.

Nishimura, Kozo: *See—*
Nishimoto, Yoshiro; Yoneda, Yasuji; Imaoka, Shinichi; Nakai, Yasuhide; Nakaue, Akimitsu; Onishi, Yoshihiko; Tachibana, Hiroyuki; Inoue, Takayoshi; Kusaka, Takuya; Takamatsu, Hiroyuki; Tojyo, Shigeki; Kajikawa, Hiroshi; and Nishimura, Kozo, 4,874,939, Cl. 250-211.00J.

Nishioka, Goro: *See—*
Sano, Harunobu; Sakabe, Yukio; and Nishioka, Goro, 4,875,136, Cl. 361-321.000.

Nishizawa, Minoru, to Gakei Electric Works Co., Ltd. Single crystal growing method having improved melt control. 4,874,458, Cl. 156-607.000.

Nissan Chemical Industries, Ltd.: *See—*
Ogura, Tomoyuki; Kawamura, Yasuo; Ishii, Shigeru; Baba, Masatoshi; Taniguchi, Masakazu; Hirose, Masayoshi; Hirata, Kiminori; and Ochiai, Yoshinori, 4,874,861, Cl. 544-229.000.

Nissan Motor Co., Ltd.: *See—*
Fujiki, Hiroyuki; Michiura, Yoshiharu; and Inoue, Kiyoshi, 4,874,645, Cl. 428-31.000.
Muranaka, Shigeo; Ohkawa, Kouzaburou; Yokoyama, Junichi; Matayoshi, Yutaka; and Kamegaya, Shigeru, 4,873,953, Cl. 123-308.000.
Naito, Genpei, 4,874,056, Cl. 180-233.000.
Nasu, Tetsuji; and Shiina, Jun, 4,874,200, Cl. 296-197.000.
Takai, Ryoji, 4,874,651, Cl. 428-81.000.

Nisshin Chemical Co., Ltd.: *See—*
Saitoh, Izumi; Kido, Shigeru; Sasaki, Yoshio; and Shinohara, Syuichiro, 4,874,830, Cl. 526-318.400.

Nitto Electric Industrial Co., Ltd.: *See—*
Higashi, Kazumi; and Noda, Yuzuru, 4,874,834, Cl. 528-176.000.

Nixdorf Computer AG: *See—*
Brockmann, Werner, 4,874,968, Cl. 307-303.000.

NKK Corporation: *See—*
Uesugi, Mitsuaki; Inomata, Masaichi; and Komine, Isamu, 4,874,955, Cl. 250-550.000.

Noda, Masayuki: *See—*
Takahashi, Kiyoshi; and Noda, Masayuki, 4,875,120, Cl. 360-106.000.

Noda, Yasushi: *See*—
Ando, Yashiko; Noda, Yasushi; and Abe, Yohji, 4,875,119, Cl. 360-105.000.

Noda, Yuzuru: *See*—
Higashi, Kazumi; and Noda, Yuzuru, 4,874,834, Cl. 528-176.000.

Nogami, Akira: *See*—
Shirai, Miyuki; and Nogami, Akira, 4,874,683, Cl. 430-114.000.

Nolan, Timothy J.: *See*—
Antoni, Patricia A.; Nolan, Timothy J.; Hayes, Thomas J.; Arneson, Theodore R.; and Coleman, Jerry E., 4,874,083, Cl. 206-45.320.

Nonomura, Tsutomu; and Abe, Hidetoshi, to Toyo Ink Manufacturing Co., Ltd. Flat-bed press and flat-bed printing method. 4,873,924, Cl. 101-146.000.

Nordlund, James J.; and Rheins, Lawrence A., to University of Cincinnati. Method of using melanocyte stimulating hormone as dermatis treatment. 4,874,744, Cl. 514-13.000.

Nordson Corporation: *See*—
Binder, John J.; and Kaiser, Thomas A., 4,873,937, Cl. 118-44.000.
Boger, Bentley J.; and Petrecca, Peter J., 4,874,451, Cl. 156-291.000.

Norimatsu, Takashi, to Yamaha Corporation. Electronic musical instrument having playing and parameter adjustment modes. 4,873,904, Cl. 84-722.000.

Noro, Katsuhiko: *See*—
Shino, Masami; Takano, Hideaki; Nakata, Jitsuo; and Noro, Katsuhiko, 4,874,592, Cl. 423-262.000.

Norsk Hydro a.s.: *See*—
Borretzen, Bernt; Larsen, Rolf O.; Pettersen, Erik O.; Dornish, John M.; and Oftebro, Rolf, 4,874,780, Cl. 514-452.000.

North American Philips Corporation: *See*—
Lorenzen, David M., 4,875,008, Cl. 324-208.000.

North American Philips Corporation, Signetics Division: *See*—
Fletcher, Thomas D., 4,874,971, Cl. 307-605.000.

North Carolina State University: *See*—
Palmour, John W., 4,875,083, Cl. 357-23.600.

Northern Telecom Limited: *See*—
Lynch, David L.; and Quesnel, Guy C., 4,875,045, Cl. 341-139.000.

Norton Company: *See*—
Szymanski, Thomas; and Turner, Stephen M., 4,874,586, Cl. 422-177.000.

Noto, Yasuo: *See*—
Kimura, Hiroshi; Naito, Shotaro; Miyashita, Kunio; Noto, Yasuo; Sugiura, Noboru; Takahashi, Tadashi; Yamamura, Hirohisa; Yamashita, Seizi; Kawamata, Syooichi; Tajima, Fumio; and Horikoshi, Shigeru, 4,874,053, Cl. 180-79.100.

Nouevelle Ice Cream Corporation: *See*—
Greig, Donald G.; and Bonneau, Edward L., III, 4,874,627, Cl. 426-565.000.

Novation Design Ltd.: *See*—
Ziegler, James T., 4,874,341, Cl. 446-109.000.

Novosel, David: *See*—
Campardo, Giovanni; and Novosel, David, 4,874,965, Cl. 307-272.300.

Nowack, William C., to Richmond Bank. Paint spray booth and filter therefor. 4,874,412, Cl. 55-385.100.

Nowak, Thomas E.; Smith, Edward J.; and Vassiliou, Eustathios, to Vassiliou, Eustathios. Wall fastener and method of fabrication. 4,874,277, Cl. 411-61.000.

Nu-Tech Systems, Inc.: *See*—
Burch, Elsward K., 4,873,759, Cl. 29-700.000.

Nunez, Chris E., to International Medical Innovators, Inc. Needle safety guard. 4,874,384, Cl. 604-198.000.

Nuova Sme S.p.A.: *See*—
Mainardi, Bruno; and Vivian, Domenico, 4,874,298, Cl. 417-315.000.

Nusselder, Frederik B.: *See*—
Grobecker, Hermann; Heher, Werner; Zielasek, Adelbert; and Nusselder, Frederik B., 4,874,085, Cl. 206-309.000.

Oba, Kiyoyuki: *See*—
Sugimura, Tuyoshi; Hori, Kenji; and Oba, Kiyoyuki, 4,873,917, Cl. 99-355.000.

Obagi, Zein E. Method for healing damaged skin. 4,874,361, Cl. 604-20.000.

Obara, Kazuaki: *See*—
Takamura, Yoshinari; Obara, Kazuaki; and Nagashima, Michiyoshi, 4,875,203, Cl. 369-46.000.

Obara, Takashi, to NEC Corporation. Random access memory device with nibble mode operation. 4,875,189, Cl. 365-189.040.

O'Boyle, Matthew, to STA-SET Corporation. Fluid dispensing device. 4,874,386, Cl. 604-246.000.

O'Brien, R. N.; and Santhanam, K. S. V., to University of Victoria. Bilayer electronically conductive polymers and process for their production. 4,874,735, Cl. 502-159.000.

Occidental Chemical Corporation: *See*—
O'Reilly, Neil J.; and Lin, Henry C., 4,874,876, Cl. 549-49.000.

Ochi, Tatsuyuki; Tanaka, Nobuo; and Mio, Kohei, to Kajima Corporation. Method and device for measurement with laser beam. 4,874,238, Cl. 356-1.000.

Ochiai, Hironori; Suzuki, Etsuo; and Ikuta, Kazuo, to Aisin Seiki Kabushiki Kaisha; and Kanto Jidosha Kogyo Kabushiki Kaisha. Sliding type sunroof lift down device. 4,874,202, Cl. 296-222.000.

Ochiai, Yoshinori: *See*—
Ogura, Tomoyuki; Kawamura, Yasuo; Ishii, Shigeru; Baba, Masatoshi; Taniguchi, Masakazu; Hirose, Masayoshi; Hirata, Kiminori; and Ochiai, Yoshinori, 4,874,861, Cl. 544-229.000.

Oda, Isao; and Soma, Takao, to NGK Insulators, Ltd. Metal-ceramic composite bodies. 4,874,674, Cl. 428-469.000.

Oda, Kyoko; Takahasi, Kunimasa; and Seo, Iwao, to Mitsubishi Petrochemical Co., Ltd. Process for producing perovskite-type oxides of the ABO_3 type. 4,874,598, Cl. 423-598.000.

Odaka, Kentaro; Fukami, Tadashi; and Ozaki, Shinya, to Sony Corporation. Apparatus for reproducing a digital signal. 4,875,111, Cl. 360-64.000.

Odaka, Seiichi: *See*—
Sato, Masahiko; Konuma, Toshimitsu; Odaka, Seiichi; Yamaguchi, Toshiharu; Watanabe, Toshio; Aoyagi, Osamu; Tabata, Kaoru; Isigaki, Chizuru; Sakayori, Hiroyuki; Kobayashi, Ippei; Osabe, Akio; and Yamazaki, Shunpei, 4,874,461, Cl. 156-633.000.

O'Dea, Kevin J., to Pitney Bowes Inc. Envelope flap moistener. 4,873,941, Cl. 118-669.000.

Odijk, Eddy A. M.: *See*—
Van Twist, Robert A. H.; Hopmans, Franciscus P. M.; and Odijk, Eddy A. M., 4,875,207, Cl. 370-85.120.

Oftebro, Rolf: *See*—
Borretzen, Bernt; Larsen, Rolf O.; Pettersen, Erik O.; Dornish, John M.; and Oftebro, Rolf, 4,874,780, Cl. 514-452.000.

Ogata, Takashi; Kato, Masanori; Kawasumi, Yoshio; Tominaga, Chikara; and Tanaka, Kanji, to Nippon Mining Co., Ltd. Method for producing high purity electrolytic copper. 4,874,436, Cl. 148-2.000.

Ogata, Yoshihiro: *See*—
Ishikawa, Toyoji; Kaneko, Toshio; Endo, Shuichi; Ogata, Yoshihiro; and Takaya, Toshihiko, 4,873,940, Cl. 118-651.000.

Ogawa, Hiroshi: *See*—
Okita, Tsutomu; Nakahara, Hiromi; and Ogawa, Hiroshi, 4,874,636, Cl. 427-130.000.

Ogawa, Tetsuya: *See*—
Yoshida, Naoyuki; Kitano, Kisei; and Ogawa, Tetsuya, 4,874,546, Cl. 252-299.610.

Ogawa, Yo: *See*—
Ando, Katsutoshi; and Ogawa, Yo, 4,874,659, Cl. 428-221.000.

Ogiwara, Akira: *See*—
Kamon, Yoshiyuki; Ogiwara, Akira; and Nageno, Koji, 4,874,316, Cl. 439-39.000.

Oguchi, Yukiko: *See*—
Yamada, Shin-ichi; Goto, Takao; Mashiko, Toshihisa; Kogi, Kentaro; Oguchi, Yukiko; and Narita, Senichi, 4,874,760, Cl. 514-234.200.

Ogura, Koji: *See*—
Ohya, Kanji; Tsunooka, Tsutomu; Ogura, Koji; Ozeki, Hirofumi; and Yamamoto, Takashi, 4,874,727, Cl. 501-134.000.

Ogura, Tomoyuki; Kawamura, Yasuo; Ishii, Shigeru; Baba, Masatoshi; Taniguchi, Masakazu; Hirose, Masayoshi; Hirata, Kiminori; and Ochiai, Yoshinori, to Nissan Chemical Industries, Ltd. Pyridazinone derivatives, preparation thereof, and insecticidal, acaricidal, nematicidal, fungicidal compositions. 4,874,861, Cl. 544-229.000.

Ogura, Yukiko: *See*—
Yokosawa, Koichi; Yamamoto, Etsuji; Nakane, Hideaki; Yabusaki, Masao; and Ogura, Yukiko, 4,875,010, Cl. 324-248.000.

Ohashi, Kazuhito, to Canon Kabushiki Kaisha. Video signal processing device. 4,875,105, Cl. 358-310.000.

Ohashi, Masahiko: *See*—
Kitoh, Osamu; and Ohashi, Masahiko, 4,874,650, Cl. 428-68.000.

Ohba, Hisao: *See*—
Kanzaki, Hisao; and Ohba, Hisao, 4,875,067, Cl. 354-325.000.

Ohgoh, Toshiharu: *See*—
Ueda, Kouichiro; Tanaka, Satoru; Kunii, Toshinobu; Kagei, Kengo; Sato, Tadashi; Ono, Hideki; Ohtsuka, Issei; Kawase, Mayumi; Ohgoh, Toshiharu; and Wakabayashi, Tsuneo, 4,874,869, Cl. 548-309.000.

Ohhara, Minoru: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,874,750, Cl. 514-42.000.

Ohi, Kimio, to Jeol Ltd. Electron microscope equipped with scanning tunneling microscope. 4,874,945, Cl. 250-306.000.

Ohi, Satoshi: *See*—
Yamamoto, Shinobu; Okada, Kunihiro; Ohi, Satoshi; Oyama, Shiro; and Takei, Yasuharu, 4,874,787, Cl. 514-531.125.

Ohkawa, Kouzaburou: *See*—
Muranaka, Shigeo; Ohkawa, Kouzaburou; Yokoyama, Junichi; Matayoshi, Yutaka; and Kamegaya, Shigeru, 4,873,953, Cl. 123-308.000.

Ohkubo, Masahiro, to Kabushiki Kaisha Daikin Seisakusho. Power transfer device. 4,873,892, Cl. 74-710.500.

Ohmi, Tadahiro. Semiconductor manufacturing apparatus. 4,874,494, Cl. 204-192.120.

Ohmori, Kiyoshi: *See*—
Leonard, Vurnen; Kato, Arthur K.; Ohmori, Kiyoshi; Fujiwara, Keisuke; and Soda, Yutaka, 4,875,128, Cl. 360-133.000.

Ohmory, Akio: *See*—
Okamoto, Takehiko; Ohmory, Akio; Sueoka, Akinori; Kawata, Ichiro; and Akasu, Hiroyuki, 4,874,522, Cl. 210-645.000.

Ohmura, Yoshio: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,874,750, Cl. 514-42.000.

Ohmura, Yutaka: *See*—
Watanabe, Naoto; Tanaka, Akira; Matsumoto, Takayuki; Ohmura, Yutaka; and Kojima, Hisao, 4,873,760, Cl. 29-714.000.

Ohnishi, Kazuyuki; Mori, Yoshiteru; and Okuda, Masakiyo, to Sharp Kabushiki Kaisha. Automatic document feeder. 4,875,072, Cl. 355-23.000.
Ohsawa, Masahiro; and Yonezawa, Eiichi, to Fuji Electric Co., Ltd. Spindle motor for driving discs. 4,874,976, Cl. 310-268.000.
Ohsawa, Seiichi, to Pioneer Electronic Corporation. Fibre-type light wavelength conversion device. 4,874,221, Cl. 350-96.290.
Ohta, Norio: *See*—
Asano, Hiroaki; Tsujiuchi, Toshio; Yoneda, Takao; Ishihara, Nobuhiro; Maruyama, Toshio; and Ohta, Norio, 4,873,793, Cl. 51-165.710.
Ohta, Yoshiyuki; and Kihara, Taku, to Sony Corporation. Digital limiting circuit. 4,875,044, Cl. 341-87.000.
Ohta, Yukio: *See*—
Maeno, Mikihiko; Ohta, Yukio; Momiyama, Yoshiharu; Ono, Hisao; Takahata, Katsumasa; Ozono, Kazuyuki; Shimizu, Makoto; and Yamamoto, Mikio, 4,874,159, Cl. 271-171.000.
Ohtsu, Norio: *See*—
Hamasaki, Naotaka; Kawamura, Hirotaka; Ohtsu, Norio; Nakakoshi, Ichiro; Ataka, Kikuo; Oomori, Kiyosi; and Kouno, Masahiko, 4,874,882, Cl. 558-131.000.
Ohtsuka, Issei: *See*—
Ueda, Kouichiro; Tanaka, Satoru; Kunii, Toshinobu; Kagei, Kengo; Sato, Tadashi; Ono, Hideki; Ohtsuka, Issei; Kawase, Mayumi; Ohgoh, Toshiharu; and Wakabayashi, Tsuneo, 4,874,869, Cl. 548-309.000.
Ohtsuka, Yasuhiro: *See*—
Hamaguchi, Shigeki; Ohtsuka, Yasuhiro; Motohiro, Tomoyoshi; Taga, Yasunori; and Ishii, Masahiko, 4,874,664, Cl. 428-325.000.
Ohya, Kanji; Tsunooka, Tsutomu; Ogura, Koji; Ozeki, Hirofumi; and Yamamoto, Takashi, to NGK Spark Plug Co., Ltd. Particulate lead titanate ceramic and composite material containing same. 4,874,727, Cl. 501-134.000.
Oka, Tetsuo: *See*—
Ozaki, Akio; Katsumata, Ryoichi; and Oka, Tetsuo, 4,874,698, Cl. 435-108.000.
Oka, Yoshinobu; and Sato, Koichi, to International Business Machines Corp. Method for automatic bill handling and bill container used therefor. 4,874,931, Cl. 235-379.000.
Okabe, Kyoji: *See*—
Hamada, Takao; Tsuchiya, Nobuo; Inatani, Toshihiro; Katayama, Eiji; Koitabashi, Toshimitsu; Okabe, Kyoji; Sumito, Mitsuo; and Takada, Yoshiyasu, 4,874,427, Cl. 75-26.000.
Okada, Kunihiro: *See*—
Yamamoto, Shinobu; Okada, Kunihiro; Ohi, Satoshi; Oyama, Shiro; and Takei, Yasuharu, 4,874,787, Cl. 514-531.125.
Okada, Yoshimi: *See*—
Wakabayashi, Ataru; Umehara, Yohichi; Morie, Satsuki; Kuwahara, Ikuro; and Okada, Yoshimi, 4,874,483, Cl. 204-94.000.
Okajima, Shiro: *See*—
Nakahara, Jirou; Ueshin, Akito; and Okajima, Shiro, 4,874,934, Cl. 235-492.000.
Okajima, Yoshio: *See*—
Washizuka, Isamu; Inoue, Yukihiro; and Okajima, Yoshio, 4,875,036, Cl. 340-784.000.
Okamoto, Hidefumi: *See*—
Sugisawa, Ko; Matsumura, Yasushi; Okamoto, Hidefumi; and Hayami, Hiroshi, 4,874,580, Cl. 422-25.000.
Okamoto, Takehiko; Ohmory, Akio; Sueoka, Akinori; Kawata, Ichiro; and Akasu, Hiroyuki, to Kuraray Co., Ltd. Polysulfone hollow fiber membrane and process for making the same. 4,874,522, Cl. 210-645.000.
Okamoto, Tetsuo: *See*—
Sasaki, Yoshiyuki; and Okamoto, Tetsuo, 4,874,658, Cl. 428-220.000.
Okamoto, Tsuguhiko, to Kabushiki Kaisha Toshiba. Digital sun sensor. 4,874,937, Cl. 250-203.00R.
Okawa, Tadashi: *See*—
Suzuki, Toshio; and Okawa, Tadashi, 4,874,881, Cl. 556-453.000.
Okazaki, Hisayoshi: *See*—
Terao, Shinji; Okazaki, Hisayoshi; and Imada, Isuke, 4,874,752, Cl. 536-55.200.
Oki Electric Industry Co., Ltd.: *See*—
Aoki, Kazuo; and Tachibana, Sadao, 4,874,913, Cl. 200-314.000.
Maeno, Mikihiko; Ohta, Yukio; Momiyama, Yoshiharu; Ono, Hisao; Takahata, Katsumasa; Ozono, Kazuyuki; Shimizu, Makoto; and Yamamoto, Mikio, 4,874,159, Cl. 271-171.000.
Sakai, Shunji; Kitagawa, Tohru; Suzuki, Kunikazu; and Watanabe, Naohiro, 4,875,099, Cl. 358-213.110.
Tanagawa, Kouji; and Yoshida, Tomoaki, 4,875,156, Cl. 364-200.000.
Okita, Tsutomu; Nakahara, Hiromi; and Ogawa, Hiroshi, to Fuji Photo Film Co., Ltd. Method for preparing magnetic recording medium. 4,874,636, Cl. 427-130.000.
Okiyama, Tadashi: *See*—
Miyauchi, Akira; Nishimoto, Hiroshi; Okiyama, Tadashi; Kitasagami, Hiroo; Sugimoto, Masahiro; Tamada, Haruo; and Emori, Shinji, 4,875,087, Cl. 357-71.000.
Oku, Seiji; Shimamura, Tooru; Naganawa, Kazutomo; and Tanamura, Toshiya, to Omron Tateisi Electronics Co. Multi channel temperature controller utilizing electronic multiplexer. 4,875,042, Cl. 340-870.170.
Okubo, Osamu; Kato, Takeo; and Tsushima, Tetsurou, to Nihon Sinku Gijutsu Kabusiki Kaisha; and Nippondenso Co., Ltd. Vacuum brazing apparatus. 4,874,918, Cl. 219-85.110.
Okuda, Masakiyo: *See*—
Ohnishi, Kazuyuki; Mori, Yoshiteru; and Okuda, Masakiyo, 4,875,072, Cl. 355-23.000.
Okumura, Jun: *See*—
Iimura, Seiji; Abe, Yoshio; Okumura, Jun; Naito, Takayuki; and Kamachi, Hajime, 4,874,856, Cl. 540-222.000.
Okumura, Katsuya: *See*—
Egawa, Hidemitsu; Aoki, Riichirou; and Okumura, Katsuya, 4,875,088, Cl. 357-67.000.
Oldham, Susan L.; Elias, William E.; Bigus, Stephen J.; and Lau, Kreisler S. Y., to Hughes Aircraft Company. Aromatic silane polymer coatings. 4,874,643, Cl. 427-340.000.
Olin Hunt Specialty Products Inc.: *See*—
Pendleton, Phillip, 4,874,477, Cl. 204-15.000.
Olive, Corinne: *See*—
Egea, Noel; and Olive, Corinne, 4,874,241, Cl. 356-238.000.
Olivenbaum, James E., to Tideland Signal Corporation. Antenna grounding system. 4,875,132, Cl. 361-117.000.
Olodort, Robert; Micalizzi, Charles; Cambruzzi, Louis; and Turchik, Randy, to Print Things. Instant label printer for host computer. 4,875,174, Cl. 364-519.000.
Olsen, Aage: *See*—
Goodwin, Dennis L.; Hawkins, Mark R.; Johnson, Wayne L.; Olsen, Aage; and Robinson, McDonald, 4,874,464, Cl. 156-646.000.
Olson, Kurt D.; and Kaiser, Steven W., to UOP. Process for the production of alkylamines. 4,874,896, Cl. 564-479.000.
Olympus Optical Co., Ltd.: *See*—
Hasegawa, Akira, 4,874,232, Cl. 350-427.000.
Yamada, Hidetoshi; and Nagasaki, Tatsuo, 4,875,091, Cl. 358-42.000.
O'Meara, Thomas R., to Hughes Aircraft Company. Optical notch filter for discriminating against coherent radiation. 4,874,223, Cl. 350-163.000.
Omron Tateisi Electronics Co.: *See*—
Ishii, Hiroaki, 4,875,163, Cl. 364-405.000.
Kimizu, Ryuichi, 4,874,932, Cl. 235-379.000.
Masuo, Yoshihisa, 4,873,758, Cl. 29-612.000.
Nakamura, Hideaki; Shimamori, Tamotsu; and Murashige, Shinichi, 4,875,016, Cl. 328-26.000.
Oku, Seiji; Shimamura, Tooru; Naganawa, Kazutomo; and Tanamura, Toshiya, 4,875,042, Cl. 340-870.170.
Yamakawa, Takeshi, 4,875,184, Cl. 364-807.000.
Onaga, Eimei M.: *See*—
Daggett, Kenneth E.; Onaga, Eimei M.; Casler, Richard J., Jr.; and Johnson, Richard A., 4,874,997, Cl. 318-568.100.
One Up, Inc.: *See*—
Volkert, John K., 4,874,356, Cl. 493-335.000.
O'Neil, Walter K.: *See*—
Mohan, Robert J.; and O'Neil, Walter K., 4,874,072, Cl. 192-58.00B.
Onishi, Yoshihiko: *See*—
Nishimoto, Yoshiro; Yoneda, Yasuji; Imaoka, Shinichi; Nakai, Yasuhide; Nakaue, Akimitsu; Onishi, Yoshihiko; Tachibana, Hiroyuki; Inoue, Takayoshi; Kusaka, Takuya; Takamatsu, Hiroyuki; Tojyo, Shigeki; Kajikawa, Hiroshi; and Nishimura, Kozo, 4,874,939, Cl. 250-211.00J.
Onizawa, Masanori: *See*—
Kubodera, Takayuki; Nakamura, Shizuo; Onizawa, Masanori; Shiroshita, Hirotaka; Mochizuki, Eiichi; Tsujimura, Masao; Atsuta, Toshikatsu; and Morooka, Takayoshi, 4,875,065, Cl. 354-82.000.
Ono, Hideki: *See*—
Ueda, Kouichiro; Tanaka, Satoru; Kunii, Toshinobu; Kagei, Kengo; Sato, Tadashi; Ono, Hideki; Ohtsuka, Issei; Kawase, Mayumi; Ohgoh, Toshiharu; and Wakabayashi, Tsuneo, 4,874,869, Cl. 548-309.000.
Ono, Hisao: *See*—
Maeno, Mikihiko; Ohta, Yukio; Momiyama, Yoshiharu; Ono, Hisao; Takahata, Katsumasa; Ozono, Kazuyuki; Shimizu, Makoto; and Yamamoto, Mikio, 4,874,159, Cl. 271-171.000.
Ono, Ken'ichi: *See*—
Matsuoka, Morito; and Ono, Ken'ichi, 4,874,497, Cl. 204-298.000.
Ono, Koji: *See*—
Hara, Toshihiro; Yotsutani, Akio; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, 4,875,231, Cl. 379-61.000.
Ono, Shigetoshi: *See*—
Yamanouchi, Junichi; Ono, Shigetoshi; Hirano, Tsumoru; Watanabe, Toshiyuki; Sakai, Nobuo; and Mihayashi, Keiji, 4,874,689, Cl. 430-548.000.
Ono, Takeshi, to Canon Kabushiki Kaisha. Thermal recording apparatus with variably controlled energization of the heating elements thereof. 4,875,056, Cl. 346-76.0PH.
Onoda, Shigeyoshi: *See*—
Sootome, Sumitoshi; Mizutani, Morikazu; Ikemoto, Isao; Kanemitsu, Shinji; Kitajima, Hajime; and Onoda, Shigeyoshi, 4,875,075, Cl. 355-50.000.
Ontario Limited: *See*—
Arnott, John; and Kaga, Gary, 4,874,099, Cl. 211-50.000.
Oomori, Kiyosi: *See*—
Hamasaki, Naotaka; Kawamura, Hirotaka; Ohtsu, Norio; Nakakoshi, Ichiro; Ataka, Kikuo; Oomori, Kiyosi; and Kouno, Masahiko, 4,874,882, Cl. 558-131.000.
Ooms, Leo A. A.; and Degryse, Anne-Dominique A. Y., to Janssen Pharmaceutica N.V. Method of promoting wound-healing. 4,874,766, Cl. 514-258.000.

Oono, Toshio, to Aisin Takaoka Limited. Brake apparatus for automotive vehicle. 4,874,064, Cl. 188-70.00R.

Ophir Corporation: *See*—
Nelson, Loren D.; and Cerni, Todd A., 4,874,572, Cl. 376-256.000.

Optical Technologies, Inc.: *See*—
Einzig, Robert E., 4,873,989, Cl. 128-692.000.

Orange Water & Sewer Authority: *See*—
Williamson, Ronald E., 4,874,519, Cl. 210-605.000.

O'Reilly, Neil J.; and Lin, Henry C., to Occidental Chemical Corporation. Process for the preparation of 2-(2-thienyl)-ethylamine and derivatives thereof. 4,874,876, Cl. 549-49.000.

Orikasa, Teruo; Sumi, Sigeo; and Taguchi, Hiroshi, to Somar Corporation. Pallet stocker apparatus for printer. 4,874,282, Cl. 414-416.000.

Ortho Pharmaceutical Corporation: *See*—
Russell, Ronald K., 4,874,771, Cl. 514-331.000.

Ory, Raymond J.; and Smeltzer, Paul. Tray and tool holder adaptable to stepladders. 4,874,147, Cl. 248-210.000.

Osabe, Akio: *See*—
Sato, Masahiko; Konuma, Toshimitsu; Odaka, Seiichi; Yamaguchi, Toshiharu; Watanabe, Toshio; Aoyagi, Osamu; Tabata, Kaoru; Isigaki, Chizuru; Sakayori, Hiroyuki; Kobayashi, Ippei; Osabe, Akio; and Yamazaki, Shunpei, 4,874,461, Cl. 156-633.000.

Osborne, Robert B.: *See*—
McKinney, Ronald J.; and Osborne, Robert B., 4,874,884, Cl. 558-338.000.

O'Shannessy, Daniel J. Proteins bound to a marker or solid phase support matrix using a hydrazone linkage. 4,874,813, Cl. 525-54.100.

Oshima, Michitaka: *See*—
Kato, Kiyotaka; and Oshima, Michitaka, 4,875,033, Cl. 340-706.000.

Oshita, Masahide; Isai, Masaaki; and Fukunaka, Toshiaki, to Toyo Communication Equipment Co., Ltd. Intermetallic compound semiconductor thin film and method of manufacturing same. 4,874,438, Cl. 148-400.000.

Ostman, Thomas L.: *See*—
Karlsson, Hakan I.; Lundqvist, Inge J.; Hardin, Bengt Y.; and Ostman, Thomas L., 4,874,467, Cl. 162-198.000.

Osuga, Naoto: *See*—
Kato, Masaaki; Uno, Tetsuya; Kobayashi, Masao; and Osuga, Naoto, 4,874,890, Cl. 560-205.000.

Otagawa, Takaaki: *See*—
Madou, Marc J.; and Otagawa, Takaaki, 4,874,500, Cl. 204-412.000.

Otis Elevator Company: *See*—
Taylor, Kenneth D., 4,874,063, Cl. 187-130.000.

Otsuka Pharmaceutical Company, Limited: *See*—
Ueda, Hiraki; Miyamoto, Hisashi; Aki, Shinji; and Otsuka, Tatsuya, 4,874,764, Cl. 514-254.000.

Otsuka, Tatsuya: *See*—
Ueda, Hiraki; Miyamoto, Hisashi; Aki, Shinji; and Otsuka, Tatsuya, 4,874,764, Cl. 514-254.000.

Otto Hansel GmbH: *See*—
Kaplan, Horst; and Grube, Gerhard, 4,874,076, Cl. 198-370.000.

Ouellette, Thomas: *See*—
Frimmel, James J., Jr.; Ouellette, Thomas; and Deglin, Richard N., 4,875,157, Cl. 364-200.000.

Output Technology Corporation: *See*—
Rubinshtein, Bernard, 4,874,121, Cl. 226-74.000.

Overby, Kenneth W., to La-Man Corporation. Liquid drain assembly. 4,874,408, Cl. 55-218.000.

Overdijk, Dik R.; Bolder, Antonius J. J.; Beirens, Leopold C. M.; and Van Rens, Piet C. J., to U.S. Philips Corporation. Display device with adjustable deflection unit. 4,874,982, Cl. 313-440.000.

Owen, Hartley: *See*—
Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., 4,874,503, Cl. 208-67.000.

Owen, S. Hudson, to Kerr-McGee Chemical Corporation. Rail-tie fastening assembly. 4,874,128, Cl. 238-355.000.

Owens-Corning Fiberglas Corporation: *See*—
Bershas, James P.; and Tobias, Russell H., 4,874,837, Cl. 528-291.000.

Oxenius, Rudiger; Burgi, Ernst; Arnold, Vladimir; and Rakoczi, Ferenc, to Ciba-Geigy Corporation. Process for the diazotisation of primary aromatic amines which are sparingly soluble in water. 4,874,847, Cl. 534-565.000.

Oxidyne Corporation: *See*—
Titmas, James A., 4,874,560, Cl. 261-76.000.

Oy Stille Ab: *See*—
Gabran, Clas, 4,874,379, Cl. 604-168.000.

Oyama, Shiro: *See*—
Yamamoto, Shinobu; Okada, Kunihiro; Ohi, Satoshi; Oyama, Shiro; and Takei, Yasuharu, 4,874,787, Cl. 514-531.125.

Ozaki, Akio; Katsumata, Ryoichi; and Oka, Tetsuo, to Kyowa Hakko Kogyo Co., Ltd. Process for producing tryptophan. 4,874,698, Cl. 435-108.000.

Ozaki, Shinya: *See*—
Odaka, Kentaro; Fukami, Tadashi; and Ozaki, Shinya, 4,875,111, Cl. 360-64.000.

Ozarski, Robert G.: *See*—
Watts, Michael P. C.; Perera, Thiloma I.; Myers, David W.; Ozarski, Robert G.; Schipper, John F.; and Tan, Raul V., 4,874,240, Cl. 356-73.000.

Ozawa, Takashi; and Kobayashi, Hidetoshi, to Fuji Photo Film Co., Ltd. Silver halide photographic materials comprising specific organic solvents. 4,874,688, Cl. 430-546.000.

Ozeki, Hirofumi: *See*—
Ohya, Kanji; Tsuncoka, Tsutomu; Ogura, Koji; Ozeki, Hirofumi; and Yamamoto, Takashi, 4,874,727, Cl. 501-134.000.

Ozono, Kazuyuki: *See*—
Maeno, Mikihiko; Ohta, Yukio; Momiyama, Yoshiharu; Ono, Hisao; Takahata, Katsumasa; Ozono, Kazuyuki; Shimizu, Makoto; and Yamamoto, Mikio, 4,874,159, Cl. 271-171.000.

Packaging Concepts, Inc.: *See*—
Mendenhall, Abraham H.; Irace, Joseph F.; and Skudrzyk, Joseph, 4,874,620, Cl. 426-113.000.

Packaging Corporation of America: *See*—
Antoni, Patricia A.; Nolan, Timothy J.; Hayes, Thomas J.; Arneson, Theodore R.; and Coleman, Jerry E., 4,874,083, Cl. 206 45.320.

Palett, Anthony P.; and Spear Jr., A. Gil, to Anthony P. Palett. Vehicle telephone with call answering and recording means. 4,875,229, Cl. 379-58.000.

Palmer, John M.: *See*—
Voorhis, Roger J.; and Palmer, John M., 4,873,838, Cl. 62-207.000.

Palmieri, Thomas: *See*—
Meserol, Peter M.; and Palmieri, Thomas, 4,873,993, Cl. 128-760.000.

Palmour, John W., to North Carolina State University. Metal-insulator-semiconductor capacitor formed on silicon carbide. 4,875,083, Cl. 357-23.600.

Palosi, Eva: *See*—
Lapis, Erzsebet; Toth, Edit; Kiss, Bela; Torley, Jozsef; Palosi, Eva; Hajdu, Istvan; Szporny, Laszlo ; Groo, Dora; and Laszlovszky, Istvan, 4,874,765, Cl. 514-255.000.

Pan, Ju-Don T., to Microelectronics and Computer Technology Corporation. Method of deposition of metal into cavities on a substrate. 4,874,493, Cl. 204-192.110.

Panesar, Lukhbir S.: *See*—
Law, David J. C.; and Panesar, Lukhbir S., 4,873,959, Cl. 123-458.000.

Panex Corporation: *See*—
Delatorre, Leroy C., 4,873,870, Cl. 73-733.000.

Panian, Thomas L.: *See*—
Luttmer, David J.; Panian, Thomas L.; Wixey, Barry D.; and Wilson, Raymond L., 4,873,770, Cl. 33-706.000.

Paper Converting Machine GmbH: *See*—
Meyer, Dieter, 4,874,078, Cl. 198-409.000.

Papst, Gero; and Nagl, Michael, to Korf Engineering GmbH; and Voest-Alpine Aktiengesellschaft. Apparatus for cooling a hot product gas. 4,874,037, Cl. 165-47.000.

Paradies, Henrich H., to Medice Chem.-Pharm. Fabrik Putter GmbH & Co. Pharmaceutical preparations. 4,874,850, Cl. 536-3.000.

Park, Hee K.: *See*—
Kim, Myung S.; Kang, Hyun S.; Lim, Soon K.; and Park, Hee K., 4,874,712, Cl. 437-31.000.

Parker, Wade: *See*—
Clark, Gary E., 4,874,182, Cl. 280-30.000.

Parlante, John K. Pistol holster with limiting swing clutch. 4,874,118, Cl. 224-198.000.

Parrish, Timothy L., to Eaton Corporation. Electrical reversing switch. 4,874,911, Cl. 200-6.00R.

Paschke, Reinhard: *See*—
Yong, Bak G.; Petra, Barth; Dietrich, Demus; Detlev, Joachimi; Kampa, Barbara; Kohler, Saskia; Mohr, Kristine; Paschke, Reinhard; Pelzl, Gerhard; Rosenfeld, Ulrich; Schafer, Wolfgang; Scherf, Klaus-Dieter; Tschirske, Carsten; Weissflog, Wolfgang; and Zaschke, Horst, 4,874,544, Cl. 252-299.610.

Patel, Parbhubhai D.: *See*—
Arroyo, Candido J.; and Patel, Parbhubhai D., 4,874,219, Cl. 350-96.230.

Paterson, James L., to Texas Instruments Incorporated. Read only memory with improved channel length control and method of forming. 4,874,715, Cl. 437-43.000.

Paton, Eric R.; and Cooley, William U. Cargo transporting carrier. 4,874,120, Cl. 224-266.000.

Patriquin, Douglas R.: *See*—
Spillman, William B., Jr.; Rudd, Robert E., III; Ellinger, Sylvester M.; Patriquin, Douglas R.; and Kline, Bruce R., 4,874,245, Cl. 356-364.000.

Paukovits, Edward J., Jr.; and Wright, Susan E., to AMP Incorporated. Method of mounting a replaceable EMI spring strip. 4,874,337, Cl. 439-609.000.

Paul, Harold J. Ceiling tile hold down clip. 4,873,809, Cl. 52-489.000.

Paul, Leland S.: *See*—
Andrews, William H.; Brothers, Virginia M.; Files, James G.; Kuhn, Irene; McCaman, Michael T.; Paul, Leland S.; Sias, Stacey R.; Gore, Thomas C.; Newman, Karel Z., Jr.; and Tedesco, John L., 4,874,705, Cl. 435-252.330.

Pavel, Wilfried, to Wilfreid Pavel Machinenbau. Clothing article packaging machine. 4,873,812, Cl. 53-241.000.

Pavie, Claude: *See*—
Bergerioux, Jean-Marcel; Pavie, Claude; and Plent, Christian, 4,874,281, Cl. 414-285.000.

Pawlik, Robert S.; and Rasch, Kenneth R., to Xerox Corporation. Integrated fuser connector and alignment member. 4,875,068, Cl. 355-286.000.

Payne, Donna W.; and Talalay, Paul, to Johns Hopkins University, Med School, The. Novel bacterium inducible to produce unique steroid-transforming enzymes: preparation and applications thereof. 4,874,696, Cl. 435-26.000.

Payre, Didier; Crozat, Georges; and Spinner, Bernard, to Societe Nationale Elf Aquitaine. Three-phase heat pump. 4,873,842, Cl. 62-480.000.

Pearson, Steve: *See—*
Zdeb, Brian; Pearson, Steve; and Slater, Glenn L., 4,874,366, Cl. 604-56.000.
Pecile, Dario: *See—*
Mena, Roger; Brunel, Christian; and Pecile, Dario, 4,874,986, Cl. 313-505.000.
Pegasus Sewing Machine Mfg. Co., Ltd.: *See—*
Takagi, Katsumi; Negoro, Toshihito; and Tamagawa, Itaru, 4,873,931, Cl. 112-121.110.
Peglion, Jean L.; Poignant, Jean C.; and Vian, Joel, to Adir Et Cie. Certain dihydrobenzofuran butanoic and pentanoic acid derivatives. 4,874,878, Cl. 549-462.000.
Pelikan Aktiengesellschaft: *See—*
Borchers, Jurgen; and Bubolz, Petra, 4,874,811, Cl. 524-516.000.
Pellini, Jean-Pierre: *See—*
Nicholas Marchiani Chatelain, Marie L.; and Pellini, Jean-Pierre, 4,874,033, Cl. 165-1.000.
Pelura, Timothy J.: *See—*
Chang, Stephen S.; Bao, Yongde; and Pelura, Timothy J., 4,874,629, Cl. 426-601.000.
Pelzl, Gerhard: *See—*
Yong, Bak G.; Petra, Barth; Dietrich, Demus; Detlev, Joachimi; Kampa, Barbara; Kohler, Saskia; Mohr, Kristine; Paschke, Reinhard; Pelzl, Gerhard; Rosenfeld, Ulrich; Schafer, Wolfgang; Scherf, Klaus-Dieter; Tschirske, Carsten; Weissflog, Wolfgang; and Zaschke, Horst, 4,874,544, Cl. 252-299.610.
Pendleton, Phillip, to Olin Hunt Specialty Products Inc. Process for preparing the through hole walls of a printed wiring board for electroplating. 4,874,477, Cl. 204-15.000.
Penninger, Josef: *See—*
Schmid, Karl-Heinz; Penninger, Josef; and Moeller, Hinrich, 4,874,579, Cl. 422-16.000.
Pennwalt Corporation: *See—*
Baron, Arthur L.; Myers, Terry N.; and Wicher, Jerome, 4,874,803, Cl. 524-94.000.
Pepinsky, R. Blake: *See—*
Wallner, Barbara P.; Pepinsky, R. Blake; and Garwin, Jeffrey L., 4,874,743, Cl. 514-12.000.
Perchonock, Carl D.: *See—*
Gleason, John G.; Hall, Ralph F.; Ku, Thomas W.; and Perchonock, Carl D., 4,874,792, Cl. 514-570.000.
Perera, Thiloma I.: *See—*
Watts, Michael P. C.; Perera, Thiloma I.; Myers, David W.; Ozarski, Robert G.; Schipper, John F.; and Tan, Raul V., 4,874,240, Cl. 356-73.000.
Perez, Roberto. Trauma stretcher. 4,873,732, Cl. 5-81.00B.
Pericomp Corporation: *See—*
Joannou, Kyriacos; Wilson, Kenneth; and Lowry, Alan B., 4,875,125, Cl. 360-128.000.
Perkin-Elmer Corporation, The: *See—*
Gonner, Winfried, 4,874,250, Cl. 374-43.000.
Scott, Raymond P. W.; and Katz, Elena, 4,873,862, Cl. 73-23.100.
Perkins, James M.: *See—*
Atlas, George N.; Donnally, Leroy C.; Urban, Donald P.; Perkins, James M.; and Wilson, Timothy C., 4,874,308, Cl. 425-544.000.
Perkins, Warren E. Method and means for dispensing respirating gases by effecting a known displacement. 4,873,971, Cl. 128-201.230.
Permuy, Alfred: *See—*
Pierre, Andre; Batilteu, Francois; Brosselard, Jean-Pierre; Permuy, Alfred; Pirot, Francois-Xavier; and Spirkovitch, Serge, 4,873,868, Cl. 73-517.00R.
Perren, Benno. Apparatus for continuously measuring the turbidity of a fluid. 4,874,243, Cl. 356-342.000.
Perron, Maurice: *See—*
Gravisse, Philippe; Duchateau, Jacques; and Perron, Maurice, 4,874,188, Cl. 283-89.000.
Perry, Nigel B.: *See—*
Munro, Murray H. G.; Perry, Nigel B.; and Blunt, John W., 4,874,767, Cl. 514-278.000.
Perry, Paul D.: *See—*
DeJong, Allan W.; and Perry, Paul D., 4,874,010, Cl. 137-484.400.
Personal Diagnostics, Inc.: *See—*
Meserol, Peter M.; and Palmieri, Thomas, 4,873,993, Cl. 128-760.000.
Pesata, Patrick J., Jr.: *See—*
Boon, Wyndham; Gartland, Robert J.; and Pesata, Patrick J., Jr., 4,874,670, Cl. 428-423.900.
Peterson, David; Chen, Loren; and Iliff, Robert J., to Clorox Company, The. Stable liquid nonaqueous detergent compositions. 4,874,537, Cl. 252-99.000.
Peterson, Stephen C.: *See—*
Brimhall, Owen D.; Peterson, Stephen C.; Kotlyar, Oleg; and Ghosh Roy, Dilip N., 4,874,358, Cl. 494-37.000.
Petra, Barth: *See—*
Yong, Bak G.; Petra, Barth; Dietrich, Demus; Detlev, Joachimi; Kampa, Barbara; Kohler, Saskia; Mohr, Kristine; Paschke, Reinhard; Pelzl, Gerhard; Rosenfeld, Ulrich; Schafer, Wolfgang; Scherf, Klaus-Dieter; Tschirske, Carsten; Weissflog, Wolfgang; and Zaschke, Horst, 4,874,544, Cl. 252-299.610.
Petrecca, Peter J.: *See—*
Boger, Bentley J.; and Petrecca, Peter J., 4,874,451, Cl. 156-291.000.
Petron, Terry L. Disk shaped fishing line bobber. 4,873,784, Cl. 43-44.950.
Petrov, Vyacheslav V.; Gorshkov, Nikolai V.; Antonov, Alexandr A.; Tokar, Alexandr P.; Krjuchin, Andrei A.; and Shanoilo, Semen M., to Institut Problem Modelirovania V Energetike Akademii Nauk Ukrainskoi SSR. Method of erasing information. 4,875,204, Cl. 369-100.000.
Petschauer, Franz: *See—*
Sbaschnigg, Johann; and Petschauer, Franz, 4,874,468, Cl. 162-300.000.
Pettersen, Erik O.: *See—*
Borretzen, Bernt; Larsen, Rolf O.; Pettersen, Erik O.; Dornish, John M.; and Oftebro, Rolf, 4,874,780, Cl. 514-452.000.
Pfaffle, Ernst, to Sickinger Company. Semi-automatic binder. 4,874,279, Cl. 412-39.000.
Pfeiffer, Loren N.; and West, Kenneth W., to American Telephone Telegraph Company, AT&T Bell Laboratories. Apparatus comprising a high-vacuum chamber. 4,873,833, Cl. 62-55.500.
Pfister, William R.: *See—*
DiSapio, Alfred J.; Pfister, William R.; and Sheeran, Mary A., 4,874,129, Cl. 239-36.000.
Pfizer Inc.: *See—*
Crawford, Thomas C.; Keely, Stanley L.; Larson, David L.; Lombardino, Joseph G.; and Maciejko, James J., 4,874,757, Cl. 514-226.500.
Schnur, Rodney C.; and Fliri, Anton F. J., 4,874,864, Cl. 546-153.000.
Urban, Frank J., 4,874,877, Cl. 549-66.000.
Pham, Hieu: *See—*
Hediger, Edwin A.; Ng, Yee S.; and Pham, Hieu, 4,875,057, Cl. 346-107.00R.
Pharmacia AB: *See—*
Stalberg, Ralph I., 4,874,491, Cl. 204-182.800.
Pharo, Daniel A. Clam-like packaging system. 4,874,093, Cl. 206-522.000.
Phenicie, Ronald W.: *See—*
Thompson, Marvin W.; Jenninga, Timothy C.; Scott, James A.; Phenicie, Ronald W.; Murphy, Margaret H.; Nakash, Gabriel D.; Biggers, James R.; Boudreau, Lynnlee M.; and Curiel Contreras, Jorge H., 4,874,266, Cl. 403-407.100.
Philibert, Daniel: *See—*
Nique, Francois; Nedelec, Lucien; Bouton, Marie-Madeleine; and Philibert, Daniel, 4,874,754, Cl. 514-178.000.
Philip Morris Incorporated: *See—*
Tamol, Ronald A.; Nepomuceno, Jose G.; Keritsis, Gus D.; Burnett, George H.; Thesing, Richard A.; Winterson, Warren D.; and Nichols, Walter A., 4,874,000, Cl. 131-375.000.
Phillips, Kirby: *See—*
Lopez, Benjamin L.; Beard, Steven A.; and Phillips, Kirby, 4,874,299, Cl. 417-413.000.
Phillips, Michael L.: *See—*
Bonjouklian, Rosanne; Meade, Christopher J. M.; Mihelich, Edward D.; and Phillips, Michael L., 4,874,782, Cl. 514-473.000.
Photofinish Cosmetics Inc.: *See—*
Xay, Nathan; McNab, Donald W.; and Moya, Edward J., 4,874,117, Cl. 222-487.000.
Photon Dynamics, Inc.: *See—*
Henley, Francois G.; Choi, Hee-June; Kratzer, Dean J.; and Barr, Maurice R., 4,875,006, Cl. 324-158.00R.
Piane Caterers, Inc.: *See—*
Piane, Robert A., Sr., 4,873,921, Cl. 99-422.000.
Piane, Robert A., Sr., to Piane Caterers, Inc. Multiple unit wok apparatus. 4,873,921, Cl. 99-422.000.
Picanol N.V.: *See—*
Van Bogaert, Philippe; and Vandenbroucke, Andre , 4,874,018, Cl. 139-1.00E.
Picciriello, Matteo: *See—*
Volonta, Piero; and Picciriello, Matteo, 4,873,763, Cl. 29-825.000.
Pickerrell, Daniel A.; Schrock, Donald C.; and Turner, Larry G., to Masco Corporation of Indiana. Anti-seizing cap ring. 4,874,009, Cl. 137-454.600.
Pierce, Michael E.: *See—*
Aldrich, Paul E.; Duncia, John Jonas V.; and Pierce, Michael E., 4,874,867, Cl. 548-101.000.
Pierre, Andre; Batilteu, Francois; Brosselard, Jean-Pierre; Permuy, Alfred; Pirot, Francois-Xavier; and Spirkovitch, Serge, to Metravib R.D.S. Force measurement sensor integrated on silicon, and a method of manufacture. 4,873,868, Cl. 73-517.00R.
Pierson, Joseph E.: *See—*
Beall, George H.; Pierson, Joseph E.; and Quinn, Candace J., 4,874,724, Cl. 501-10.000.
Pilkington PLC: *See—*
Clarke, Leslie T., 4,874,903, Cl. 174-35.0MS.
Pillsbury Company, The: *See—*
Weimer, John R., 4,874,917, Cl. 219-10.55M.
Pincus, David H., to American Home Products Corp. Rapid indentification of yeast and other fungal microorganisms by enzyme detection. 4,874,695, Cl. 435-19.000.
Pioneer Consolidated Corp.: *See—*
Goldstein, Harvey R.; and Haddad, Edward N., Jr., 4,874,196, Cl. 296-98.000.
Pioneer Electronic Corporation: *See—*
Ohsawa, Seiichi, 4,874,221, Cl. 350-96.290.
Yokosawa, Seiichi, 4,875,115, Cl. 360-77.150.
Pioneer Industries, Division of Core Industries, Inc.: *See—*
Kukke, Gopal S., 4,873,804, Cl. 52-217.000.
Piran, Uri, to Becton Dickinson and Company. Assay and product in which binder and liposomes are supported on a solid support. 4,874,710, Cl. 436-518.000.

Pirot, Francois-Xavier: *See—*
Pierre, Andre; Batlliteu, Francois; Brosselard, Jean-Pierre; Permuy, Alfred; Pirot, Francois-Xavier; and Spirkovitch, Serge, 4,873,868, Cl. 73-517.00R.
Piscaer, Petrus J. C., to De Erven De Weduwe J. Van Nelle B.V. Method and device for the preparation of coffee. 4,873,916, Cl. 99-289.00R.
Pitigliano, Frank J.: *See—*
McGill, Paul E.; and Pitigliano, Frank J., 4,874,305, Cl. 425-131.100.
Pitney Bowes Inc.: *See—*
O'Dea, Kevin J., 4,873,941, Cl. 118-669.000.
Plastic Development, Inc.: *See—*
Elkin, Alfred A.; and Costa, Sylvestre M., 4,874,446, Cl. 156-66.000.
Plattner, Andrew J. Soil sterilizer. 4,873,789, Cl. 47-1.420.
Plent, Christian: *See—*
Bergerioux, Jean-Marcel; Pavie, Claude; and Plent, Christian, 4,874,281, Cl. 414-285.000.
Plewes, Donald B., to University of Rochester. X-ray machine. 4,875,226, Cl. 378-146.000.
Ploog, Uwe: *See—*
Uphues, Guenter; Ploog, Uwe; and Bischof, Klaudia, 4,874,883, Cl. 558-150.000.
Podhajecki, Stephen T., to Torrington Company, The. Cage outer diameter profile. 4,874,260, Cl. 384-470.000.
Poe, Robert P., Jr.: *See—*
Elliott, William A.; Greene, Richard A.; Kennedy, Robert P.; Poe, Robert P., Jr.; and Steece, William H., 4,873,762, Cl. 29-809.000.
Poetsch, Dieter, to BTS Broadcast Television Systems GmbH. Automatic correcting of picture unsteadiness in television film scanning. 4,875,102, Cl. 358-214.000.
Poignant, Jean C.: *See—*
Peglion, Jean L.; Poignant, Jean C.; and Vian, Joel, 4,874,878, Cl. 549-462.000.
Polaroid Corporation: *See—*
Cowan, James J., 4,874,213, Cl. 350-3.670.
Polemenakos, Sotiros C.: *See—*
Wilson, Wilfred W.; Polemenakos, Sotiros C.; Potter, J. Larry; Mangold, Donald J.; Harlowe, William W.; and Schlameus, Herman W., 4,874,611, Cl. 424-410.000.
Pollard, Dianne J. Bumper sheet. 4,873,734, Cl. 5-425.000.
Polygram GmbH: *See—*
Grobecker, Hermann; Heher, Werner; Zielasek, Adelbert; and Nusselder, Frederik B., 4,874,085, Cl. 206-309.000.
Polyplastics Co., Ltd.: *See—*
Endo, Toshihiko; and Matsunaga, Nobuyuki, 4,874,807, Cl. 524-267.000.
Minamisawa, Tsuyoshi; Endo, Katsunori; Ikegami, Eitaro; and Nezu, Shigeru, 4,874,800, Cl. 523-205.000.
Pompei, Francesco; and Burke, Michael W., to Exergen Corporation. Radiation detector with temperature display. 4,874,253, Cl. 374-121.000.
Ponticelli, Robert J. Switching mechanism for anti-theft system. 4,873,936, Cl. 116-33.000.
Poor, James C., to Spencer Turbine Company, The. Vacuum producing apparatus. 4,874,410, Cl. 55-276.000.
Poplimont, Philippe: *See—*
Egee, Michel; Dartois, Robert; Marx, Jean; Merienne, Etienne; Regalia, Marcel; Poplimont, Philippe; and Van Schel, Etienne, 4,875,175, Cl. 364-551.010.
Popper, Peter: *See—*
Hallam, Donald E.; Popper, Peter; Staunton, Harold F.; Taylor, Robert E.; and Yngve, Paul W., 4,873,821, Cl. 57-293.000.
Porsche Design GmbH: *See—*
Tragatschnig, Joerg, 4,875,234, Cl. 379-434.000.
Porter, Warren W., to NCR Corporation. Liquid level control for a cryogenic fluid. 4,873,832, Cl. 62-49.200.
Post, Kendall E.: *See—*
Monson, Mark B.; Blandino, Thomas P.; Bahr, Dennis E.; and Post, Kendall E., 4,875,019, Cl. 330-302.000.
Potter, J. Larry: *See—*
Wilson, Wilfred W.; Polemenakos, Sotiros C.; Potter, J. Larry; Mangold, Donald J.; Harlowe, William W.; and Schlameus, Herman W., 4,874,611, Cl. 424-410.000.
Potter, James C.: *See—*
Greeves, Godfrey; Potter, James C.; Andrews, Richard J.; and Harris, Kenneth M., 4,874,301, Cl. 417-462.000.
Potter, Robert I. Current to pressure tranducer employing magnetic fluid. 4,874,005, Cl. 137-85.000.
PPG Industries, Inc.: *See—*
Schwenninger, Ronald L., 4,874,313, Cl. 432-247.000.
Worley, Shelby D., 4,874,532, Cl. 210-755.000.
Prabhu, Ashok N.; Hang, Kenneth W.; and Conlon, Edward J., to General Electric Company. Thick-film copper conductor inks. 4,874,550, Cl. 252-512.000.
Prada, Marco: *See—*
Brunetti, Brunetto; and Prada, Marco, 4,874,844, Cl. 530-331.000.
Prasse, Alfred: *See—*
Eck, Herbert; Fleischmann, Gerald; Prasse, Alfred; and Kolbig, Kunigunde, 4,874,638, Cl. 427-222.000.
Prentice, Robert J., to Rockwell International Corporation. Missile air inlet cover retractor system. 4,874,145, Cl. 244-53.00B.
President and Fellows of Harvard College: *See—*
Antoniades, Harry N.; and Lynch, Samuel E., 4,874,746, Cl. 514-21.000.
Preston, Frank J., to Ex-Cell-O Corporation. Plastisol slush process. 4,874,565, Cl. 264-37.000.
Price, John G.: *See—*
Fey, Kenneth C.; Freiberg, Alan L.; and Price, John G., 4,874,431, Cl. 106-2.000.
Price, John W.; and Brady, John F., III, to Mileage Validator, Inc. Odometer data computing apparatus. 4,875,167, Cl. 364-424.040.
Prime Computer, Inc.: *See—*
Blume, Carl R., Jr., 4,875,186, Cl. 364-900.000.
Print Things: *See—*
Olodort, Robert; Micalizzi, Charles; Cambruzzi, Louis; and Turchik, Randy, 4,875,174, Cl. 364-519.000.
Prism Technology, Inc.: *See—*
Cork, William H., 4,873,875, Cl. 73-863.010.
Pritchard, Robert J.: *See—*
Joseph, Earl M.; Pritchard, Robert J.; and Sufi, Arshad H., 4,874,043, Cl. 166-272.000.
Procter & Gamble Company, The: *See—*
Arnau-Munoz, Jose L.; and Cornette, Henri, 4,874,107, Cl. 220-20.000.
Bolich, Raymond E., Jr., 4,874,868, Cl. 548-110.000.
Dawson, Geoffrey G.; and Williams, Michael K., 4,874,538, Cl. 252-117.000.
Proctor & Gamble Company, The: *See—*
Strickland, Wilbur C., Jr.; and Sterling, Rosstain F., 4,874,536, Cl. 252-90.000.
Proctor-Silex, Inc.: *See—*
Houser, Philip H., 4,874,929, Cl. 219-506.000.
Prospects Corp.: *See—*
Chuang, Cliff, 4,874,938, Cl. 250-203.00R.
Provazek, Lionel D.: *See—*
Dost, Martin H.; Hopner, Emil; Melas, Constantin M.; and Provazek, Lionel D., 4,875,112, Cl. 360-65.000.
Provost, Robert S. Mill throat for pulverizer. 4,874,135, Cl. 241-57.000.
Pruitt, Gerald R.; and Bertsch, Peter, to Helix Technology Corporation. Dry roughing pump having a gas film bearing. 4,873,913, Cl. 92-158.000.
Pruszenski, Anthony S., Jr., to Energy Innovations, Inc. Solar greenhouse roof. 4,874,225, Cl. 350-259.000.
Przyklek, Rosemary: *See—*
Gunther, Wolfgang H. H.; Leone, Ronald E.; and Przyklek, Rosemary, 4,874,866, Cl. 548-100.000.
Pulkowski, Jeffrey H.; Macklem, Elizabeth A.; and Busker, L. H., to Beloit Corporation. Heated extended nip press with porous roll layers. 4,874,469, Cl. 162-359.000.
Pulvermacher, Ronald J., to Dairy Equipment Co. Milk flow indicator. 4,873,943, Cl. 119-14.160.
Puntener, Alois: *See—*
Back, Gerhard; Beffa, Fabic; Schlesinger, Ulrich; and Puntener, Alois, 4,874,849, Cl. 534-696.000.
Purcell, Robert J.; and Farris, Robert R., to Caterpillar Inc. Suspension system for a vehicle. 4,874,052, Cl. 180-9.100.
QSE Sales & Management, Inc.: *See—*
Dobnick, Dennis A., 4,874,990, Cl. 315-276.000.
Quadra Logic Technologies Inc.: *See—*
Chandler, Howard, 4,874,691, Cl. 435-7.000.
Quadro, Giuseppe, to Yason S.r.l. Compound having mucus regulating and elastase-inhibitory activities, for the therapy of pulmonal emphysema and pulmonal fibrosis. 4,874,776, Cl. 514-365.000.
Quaker Plastic Corporation: *See—*
Dahowski, Donald E., 4,873,802, Cl. 52-184.000.
Quesnel, Guy C.: *See—*
Lynch, David L.; and Quesnel, Guy C., 4,875,045, Cl. 341-139.000.
Quinn, Candace J.: *See—*
Beall, George H.; Pierson, Joseph E.; and Quinn, Candace J., 4,874,724, Cl. 501-10.000.
Quint, Robert H.: *See—*
Morris, David L.; Filip, Mihail; D'Amelio, Frank D.; Esposito, Dominick G.; and Quint, Robert H., 4,874,364, Cl. 604-35.000.
Quinton, Walter L.: *See—*
Kregness, Glen R.; and Quinton, Walter L., 4,875,180, Cl. 364-715.030.
Quisenberry, Tony M.; and Wahlenmeier, Fred E., to Winfield Corporation. Receptacle for receiving infectious waste material. 4,874,103, Cl. 220-1.00T.
R. J. Ryddeen & Associates: *See—*
Rydeen, Robert J., 4,873,797, Cl. 52-93.000.
Rabo, Jule A.: *See—*
Miller, James G.; and Rabo, Jule A., 4,874,732, Cl. 502-74.000.
Miller, James G.; and Rabo, Jule A., 4,874,733, Cl. 502-74.000.
Radermacher, Herbert: *See—*
Kuster, Hans-Werner; Radermacher, Herbert; and Vanaschen, Luc, 4,874,418, Cl. 65-348.000.
Radiometer A/S: *See—*
Christiansen, Torben F.; and Kokholm, Finn, 4,874,501, Cl. 204-415.000.
Raffaele, Degli E.: *See—*
Leonardo, Covi; Giorgio, Bacialli; and Raffaele, Degli E., 4,874,619, Cl. 426-94.000.
Rakoczi, Ferenc: *See—*
Oxenius, Rudiger; Burgi, Ernst; Arnold, Vladimir; and Rakoczi, Ferenc, 4,874,847, Cl. 534-565.000.
Rakov, David M., to Eastman Kodak Company. Ion projection print head. 4,875,062, Cl. 346-159.000.

Ramot University Authority for Applied Research and Industrial Development Ltd.: *See*—
Abraham, Fabian, 4,874,236, Cl. 351-205.000.
Ramsauer, Dieter. Unhingeable and concealed hinge for switching boxes. 4,873,745, Cl. 16-258.000.
Rantanen, Veikko O., to A. Ahlstron Corporation. Multi-layer packaging material. 4,874,656, Cl. 428-216.000.
Rao, Kalipatnam V., to Texas Instrument Incorporated. Process for fabricating integrated circuit structure with extremely smooth polysilicone dielectric interface. 4,874,716, Cl. 437-43.000.
Rapp, Louis N., to Burleigh Instruments, Inc. Electromechanical translation apparatus. 4,874,979, Cl. 310-328.000.
Rasch, Kenneth R.: *See*—
Pawlik, Robert S.; and Rasch, Kenneth R., 4,875,068, Cl. 355-286.000.
Rasmussen, Jerald K.; Heilmann, Steven M.; Krepski, Larry R.; and Moren, Dean M., to Minnesota Mining and Manufacturing Company. Process for the acrylamidoacylation of alcohols. 4,874,822, Cl. 525-279.000.
Rasmussen, Ole-Bendt. High strength laminate. 4,874,653, Cl. 428-182.000.
Rathi, Dev D., to ITT Gilfillan, a division of ITT Corporation. Generalized doppler matched binary pulse compressor. 4,875,050, Cl. 342-195.000.
Raychaudhuri, Satyabrata: *See*—
Vacha, Lubos J. B.; Schultz, Peter C.; Moynihan, Cornelius T.; Raychaudhuri, Satyabrata; Cadien, Ken C.; Harbison, Barry B.; and Mossadegh, Reza, 4,874,222, Cl. 350-96.340.
Raychem Corporation: *See*—
Becker, Paul, 4,874,840, Cl. 528-480.000.
Martin, Charles L., 4,874,193, Cl. 285-369.000.
Montoya, Wayne; and Reamey, Robert H., 4,874,839, Cl. 528-480.000.
Reed, James P.; Masia, Michael; and Highe, Albert, 4,874,487, Cl. 204-147.000.
Raytheon Company: *See*—
Mathewes, James K., Jr.; Chancellor, Craig A.; and Howes, H. Frank, 4,875,209, Cl. 371-3.000.
RCM Industries Corporation: *See*—
Johnson, Arthur F.; and Sackett, Robert L., 4,874,585, Cl. 422-171.000.
Re, Alberto: *See*—
Johns, Ken; Re, Alberto; and Bargigia, Gianangelo, 4,874,842, Cl. 528-494.000.
Reamey, Robert H.: *See*—
Montoya, Wayne; and Reamey, Robert H., 4,874,839, Cl. 528-480.000.
Recker, Bradley J.: *See*—
Roe, Derrick I.; Rozman, Christopher J.; and Recker, Bradley J., 4,875,148, Cl. 363-41.000.
Rozman, Christopher J.; Roe, Derrick I.; and Recker, Bradley J., 4,875,149, Cl. 363-41.000.
Recognition Equipment Incorporated: *See*—
Sanner, Medford D., 4,874,933, Cl. 235-470.000.
RecyTec S.A.: *See*—
Hanulik, Jozef, 4,874,486, Cl. 204-140.000.
Redicon Corporation: *See*—
Bulso, Joseph D., Jr.; and McClung, James A., 4,873,859, Cl. 72-336.000.
Redler, Udo: *See*—
Hagen, Uwe; and Redler, Udo, 4,873,973, Cl. 128-303.130.
Hagen, Uwe; and Redler, Udo, 4,873,974, Cl. 128-303.130.
Reed, Carl G., to AMP Incorporated. Shunted modular electrical connector. 4,874,333, Cl. 439-514.000.
Reed, James P.; Masia, Michael; and Highe, Albert, to Raychem Corporation. Corrosion protection. 4,874,487, Cl. 204-147.000.
Reed, John F.; and Jones, Marvin E., to Minnesota Mining and Manufacturing Company. Electret filter made of fibers containing polypropylene and poly(4-methyl-1-pentene). 4,874,399, Cl. 55-2.000.
Reed Tool Company Limited: *See*—
Taylor, Malcolm R.; Barr, John D.; and Smart, John R., 4,873,895, Cl. 76-108.00A.
Regalia, Marcel: *See*—
Egee, Michel; Dartois, Robert; Marx, Jean; Merienne, Etienne; Regalia, Marcel; Poplimont, Philippe; and Van Schel, Etienne, 4,875,175, Cl. 364-551.010.
Regimand, Ali, to Troxler Electronic Laboratories, Inc. Asphalt content gauge with compensation for sample temperature deviations. 4,874,950, Cl. 250-390.040.
Rehfeldt, Karl-Heinz: *See*—
Gehrt, Heinz H.; Hildebrandt, Gunter; and Rehfeldt, Karl-Heinz, 4,874,966, Cl. 307-291.000.
Reiche, Dieter; Thuerk, Matthias; and Duerselen, Roderich, to Veb Hockvakuum Dresden. Matrix material for regenerators. 4,874,677, Cl. 428-605.000.
Reichner, Philip, to Westinghouse Electric Corp. Elongated solid electrolyte cell configurations and flexible connections therefor. 4,874,678, Cl. 429-30.000.
Reifenhauser GmbH & Co. Maschinenfabrik: *See*—
Muller, Heinz, 4,874,571, Cl. 264-175.000.
Reifferscheid, Karl J., to Metallgesellschaft Aktiengesellschaft. Method of producing nodular cast iron. 4,874,576, Cl. 420-22.000.
Reinert, Gerard E.: *See*—
Lundy, Charles E.; Krishnan, Sivaram; and Reinert, Gerard E., 4,874,802, Cl. 524-94.000.
Reinert, Gerhard, to Ciba-Geigy Corporation. Process for photochemical stabilization of polyamide fiber material and mixtures thereof with other fibers: water-soluble copper complex dye and light-stabilizer. 4,874,391, Cl. 8-442.000.
Reinforced Earth Comany, The: *See*—
Egan, Philip D., 4,874,272, Cl. 405-284.000.
Remaut, Rene Erik: *See*—
Fiers, Walter C.; and Remaut, Rene Erik, 4,874,702, Cl. 435-172.000.
Renault, Greg. Adjustable sheet for a windsurfing harness. 4,873,934, Cl. 114-39.200.
Renault Vehicules Industriels: *See*—
Andre, Venant, 4,873,883, Cl. 74-473.00R.
Renishaw plc: *See*—
Jarman, Thomas B., 4,875,177, Cl. 364-559.000.
Renner, Rolf. Armrest for bicycle handlebar. 4,873,886, Cl. 74-551.800.
Republic Electronics Company: *See*—
Hwang, Yu-Tsang G., 4,875,182, Cl. 364-732.000.
Rescalli, Carlo; Ricci, Riziero; Scazzosi, Adriano; and Cianci, Flavio, to Snamprogetti S.p.A. Process for dehydrating a mixture of methanol and higher alcohols. 4,874,474, Cl. 203-18.000.
Resch, William A., III; and Moak, Jonathan E., to Eastman Kodak Company. Dead time compensation for toner replenishment. 4,875,078, Cl. 355-246.000.
Research Foundation of State University of New York, The: *See*—
Shaw, David T.; Witanachchi, Sarath; and Kwok, Hoi-Sing, 4,874,741, Cl. 505-1.000.
Retzloff, Timm G., to C. G. Bretting Manufacturing Co., Inc. Dispensing fold improvement for a clip separator. 4,874,158, Cl. 270-39.000.
Reyes, Franklin: *See*—
Finnieston, Alan; Burkhalter, William E.; Reyes, Franklin; and Latta, Loren L., 4,873,968, Cl. 128-87.00R.
Reynolds, David W., to Sundstrand Corporation. Specialized hose connector for connecting hydraulic hoses and ports of different ratings. 4,874,190, Cl. 285-158.000.
Rheins, Lawrence A.: *See*—
Nordlund, James J.; and Rheins, Lawrence A., 4,874,744, Cl. 514-13.000.
Rhodehamel, Nicholas: *See*—
Durbin, Richard D.; Lukens, Jean H.; Uchytil, Thomas F.; and Rhodehamel, Nicholas, 4,874,706, Cl. 435-253.300.
Rhodes, David D.: *See*—
Frederick, Warren P.; Steele, Sarah L.; Rhodes, David D.; and Arns, Christopher L., 4,874,365, Cl. 604-54.000.
Rhone-Poulenc Agrochimie S.A.: *See*—
Chene, Alain, 4,874,846, Cl. 534-560.000.
Rhone-Poulenc Specialites Chimiques: *See*—
Chevallier, Yvonick, 4,874,594, Cl. 423-335.000.
Ricci, Riziero: *See*—
Rescalli, Carlo; Ricci, Riziero; Scazzosi, Adriano; and Cianci, Flavio, 4,874,474, Cl. 203-18.000.
Richartz, Adolf: *See*—
Jabs, Gert; and Richartz, Adolf, 4,874,832, Cl. 528-60.000.
Richeson, William E.; and Erickson, Frederick L., to Magnavox Government and Industrial Electronics Company. Pneumatic actuator with solenoid operated control valves. 4,873,948, Cl. 123-90.110.
Richey, Stephen J. Vehicular attachment system for a snowplow or the like. 4,873,775, Cl. 37-231.000.
Richmond Bank: *See*—
Nowack, William C., 4,874,412, Cl. 55-385.100.
Richter Gedeon Vegyeszeti Gyar: *See*—
Lapis, Erzsebet; Toth, Edit; Kiss, Bela; Torley, Jozsef; Palosi, Eva; Hajdu, Istvan; Szporny, Laszlo ; Groo, Dora; and Laszlovszky, Istvan, 4,874,765, Cl. 514-255.000.
Richtler, Hans-Joachim; Kreutzer, Udo; Carduck, Franz-Josef; Koester, Klaus; and Harth, Hubert, to Henkel Kommanditgesellschaft auf Aktien. Process for simultaneous bleaching and neutralization of alpha-sulfofatty acid esters. 4,874,552, Cl. 260-400.000.
Rickard, Martin R. Photography shade and vignetter. 4,875,066, Cl. 354-296.000.
Ricoh Company, Ltd.: *See*—
Bisaiji, Takashi; Sawayama, Noboru; and Yoo, Hideo, 4,875,079, Cl. 355-246.000.
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.
Ishikawa, Toyoji; Kaneko, Toshio; Endo, Shuichi; Ogata, Yoshihiro; and Takaya, Toshihiko, 4,873,940, Cl. 118-651.000.
Kamon, Kouichi, 4,875,104, Cl. 358-400.000.
Sakano, Yukio, 4,875,190, Cl. 365-189.040.
Sasaki, Saburo; Ishida, Tsutomu; and Yamamoto, Kenji, 4,874,957, Cl. 250-578.000.
Suzuki, Takami; Tatara, Yoshikuni; and Moriya, Tomoyuki, 4,874,264, Cl. 400-335.000.
Suzuki, Tetsuro; Yoshikawa, Masao; and Kojima, Akio, 4,874,481, Cl. 204-59.00R.
Ricoh Research Institute of General Electronics: *See*—
Sasaki, Saburo; Ishida, Tsutomu; and Yamamoto, Kenji, 4,874,957, Cl. 250-578.000.
Rideout, Janet L.; Barry, David W.; Lehrman, Sandra N.; St. Clair, Martha H.; and Furman, Phillip A., to Burroughs Wellcome Co. Treatment of human viral infections. 4,874,609, Cl. 424-85.400.
Riegelman, Harry, to Columbia Manufacturing Corporation. Sliding door roller apparatus. 4,873,741, Cl. 16-105.000.

Rietsch, Eike, to Texaco Inc. Method and apparatus for determining propagation velocities of elastic waves in a borehole. 4,875,197, Cl. 367-32.000.

Riggs, Olen L., Jr., to Kerr-McGee Chemical Corporation. Method of treating a titanium structure. 4,874,434, Cl. 134-3.000.

Ringdahl, Ulf; and Mattei, Vittorio, to Tetra Dev-Co. Aseptic filling unit for packing machines for long-lasting products with fluid behavior. 4,874,021, Cl. 141-85.000.

Ringwood, Alfred E. Diamond compacts and process for making same. 4,874,398, Cl. 51-293.000.

Rippel, Wally E. Woven-grid sealed quasi-bipolar lead-acid battery construction and fabricating method. 4,874,681, Cl. 429-210.000.

Risch, Alan P.: *See*—
Staniulis, Mark T.; and Risch, Alan P., 4,874,590, Cl. 423-239.000.

Rittal-Werk Rudolf Loh GmbH & Co., KG: *See*—
Wagener, Hans; and Zachrei, Jurgen, 4,874,321, Cl. 439-119.000.

Rittershaus, Erhard: *See*—
Borowski, Horst; Kausch, Erwin; Rittershaus, Erhard; Rudolph, Gert; and Schneider, Werner, 4,874,004, Cl. 131-364.000.

Riv-SKF Officine di Villar Perosa S.p.A.: *See*—
Colanzi, Franco; and Vignotto, Angelo, 4,874,261, Cl. 384-484.000.

Riyste Pty. Limited: *See*—
Maher, Jack, deceased, 4,873,772, Cl. 34-60.000.

Road Systems, Inc.: *See*—
Boyer, John D., 4,874,184, Cl. 280-423.100.

Robbins, Edward S., III. Collapsible containers. 4,874,106, Cl. 220-4.00F.

Robert Bosch GmbH: *See*—
Affeldt, Karl-Heinz; and Hantel, Ulrich, 4,873,988, Cl. 128-687.000.
Fehlmann, Wolfgang; Hofer, Gerald; Junger, Dieter; Karle, Anton; and Laufer, Helmut, 4,873,956, Cl. 123-357.000.
Heitman, Jurgen, 4,875,106, Cl. 358-314.000.
Siegel, Heinz, 4,874,208, Cl. 303-116.000.

Roberts, Auston K.; Trainer, William E.; and Biederman, David L., to Stauffer Chemical Company. Conversion of pyrophoric P_4-containing material to P_2O_5 material. 4,874,593, Cl. 423-322.000.

Roberts, Bryan W.; Fien, Alan R.; and Blackler, John, to University of Sydney. Rotor arrangement for a rotorcraft. 4,874,291, Cl. 416-122.000.

Roberts, George F.; and Walters, Philip H., to Tensor, Inc. System and method for locating an underground probe having orthogonally oriented magnetometers. 4,875,014, Cl. 324-326.000.

Roberts, James H.: *See*—
Gold, Raymond; and Roberts, James H., 4,874,951, Cl. 250-472.100.

Roberts, Joseph E.; and Griswold, William A., Jr. Cable gripping block. 4,874,152, Cl. 254-264.000.

Roberts, Robert E. Light apparatus for animal pets. 4,875,145, Cl. 362-103.000.

Roberts, Thomas E., to Ford Aerospace Corporation. Low loss power splitter. 4,875,024, Cl. 333-127.000.

Robertson, John W., Jr.: *See*—
Fry, John J.; Robertson, John W., Jr.; and Bastijanic, Edward, 4,875,000, Cl. 318-798.000.

Robeson, Lloyd M.: *See*—
Kuphal, Jeffrey A.; Robeson, Lloyd M.; and Weber, James J., 4,874,030, Cl. 164-34.000.

Robin, Mark L.: *See*—
Halpern, Donald F.; and Robin, Mark L., 4,874,901, Cl. 568-683.000.

Robinson, McDonald: *See*—
Goodwin, Dennis L.; Hawkins, Mark R.; Johnson, Wayne L.; Olsen, Aage; and Robinson, McDonald, 4,874,464, Cl. 156-646.000.

Robison, Peter D.; and Stipanovic, Arthur J., to Texaco Inc. Method for oil recovery using a modified heteropolysaccharide. 4,874,044, Cl. 166-275.000.

Rock, Erich; and Brustle, Klaus, to Julius Blum Gesellschaft M.B.H. Device for fastening a front plate to metal drawer side walls. 4,874,212, Cl. 312-330.100.

Rockefeller University, The: *See*—
Gandy, Samuel E.; and Greengard, Paul, 4,874,694, Cl. 435-15.000.

Rockwell International Corporation: *See*—
Dunn, Charlton; Bremner, Robert J.; and Meng, Sen Y., 4,874,575, Cl. 376-404.000.
Gay, Richard L.; and McKenzie, Donald E., 4,874,599, Cl. 423-490.000.
Prentice, Robert J., 4,874,145, Cl. 244-53.00B.

Rodionoff, Pierre: *See*—
Bezard, Jean-Jacques; Feppon, Philippe; and Rodionoff, Pierre, 4,874,242, Cl. 356-341.000.

Rodriques, Pedro: *See*—
Homberger, Heinrich; Timm, Jurgen; and Rodriques, Pedro, 4,874,578, Cl. 420-541.000.

Roe, Derrick I.; Rozman, Christopher J.; and Recker, Bradley J., to Sundstrand Corporation. Control for producing a low magnitude voltage at the output of a PWM inverter. 4,875,148, Cl. 363-41.000.

Roe, Derrick I.: *See*—
Rozman, Christopher J.; Roe, Derrick I.; and Recker, Bradley J., 4,875,149, Cl. 363-41.000.

Roediger, Gary A.: *See*—
Nichols, Robert K.; and Roediger, Gary A., 4,875,206, Cl. 370-85.150.

Roeding, Gretchen W.: *See*—
Bednarz, George A.; Smith, Reginald W.; Roeding, Gretchen W.; and Test, Howard R., 4,874,722, Cl. 437-209.000.

Roehm GmbH Chemische Fabrik: *See*—
Hofmann, Ingrid; Mutschler, Ernst; and Christner, Angelika, 4,874,763, Cl. 514-249.000.

Rogers, Randall R.: *See*—
Lopatin, George; Yen, Larry Y.; and Rogers, Randall R., 4,874,567, Cl. 264-45.100.

Rohm and Haas Company: *See*—
Hallden-Abberton, Michael P.; Cohen, Leslie A.; and Wood, Robert S., 4,874,824, Cl. 525-379.000.

Rojey, Alexandre; and Grehier, Alain, to Institut Francais du Petrole. Process for the simultaneous exchange of heat and matter through a porous wall. 4,873,835, Cl. 62-93.000.

Roller, Traugott, to Daimler-Benz Aktiengesellschaft. Cover strip for the lower edge of a bonded windscreen of a motor car. 4,874,198, Cl. 296-192.000.

Rongen, Engelbertus: *See*—
van der Eijk, Bart; van de Wiel, Johannes N.; Rongen, Engelbertus; and Wulms, Christiaan J. G. H., 4,874,987, Cl. 313-525.000.

Rorer Pharmaceutical Corporation: *See*—
Youssefyeh, Raymond; Chakraborty, Utpal; Magnien, Ernest; Desai, Rohit; and Lee, Thomas D-Y, 4,874,769, Cl. 514-314.000.

Rose, David B.: *See*—
Derhaag, Robert L.; and Rose, David B., 4,875,233, Cl. 379-430.000.

Rosenfeld, Ulrich: *See*—
Yong, Bak G.; Petra, Barth; Dietrich, Demus; Detlev, Joachimi; Kampa, Barbara; Kohler, Saskia; Mohr, Kristine; Paschke, Reinhard; Pelzl, Gerhard; Rosenfeld, Ulrich; Schafer, Wolfgang; Scherf, Klaus-Dieter; Tschirske, Carsten; Weissflog, Wolfgang; and Zaschke, Horst, 4,874,544, Cl. 252-299.610.

Rosenthal, Bruce C., to Kohler General Corporation. Multiple head woodworking apparatus with automated head positioning apparatus. 4,874,996, Cl. 318-567.000.

Rosenthal, Doren, to Mattel, Inc. Toy detection and signaling circuit. 4,874,343, Cl. 446-175.000.

Rossi, John J., to City of Hope. Synthetic oligonucleotides useful in diagnosis of chronic myelogenous leukemia. 4,874,853, Cl. 536-27.000.

Rossi, Remo J.; and Grady, John. Anti-scatter grid system. 4,875,227, Cl. 378-154.000.

Rothwell, Harold L., Jr.: *See*—
English, George J.; Rothwell, Harold L., Jr.; and Garrity, Donald F., Jr., 4,874,988, Cl. 313-620.000.

Roussel Uclaf: *See*—
Nique, Francois; Nedelec, Lucien; Bouton, Marie-Madeleine; and Philibert, Daniel, 4,874,754, Cl. 514-178.000.

Rowan, Joseph C.: *See*—
Walter, Jeffrey A.; Garg, Kailash C.; and Rowan, Joseph C., 4,875,026, Cl. 333-251.000.

Rowland, Bobby A.: *See*—
Watkins, Clinton E.; and Rowland, Bobby A., 4,874,442, Cl. 156-48.000.

Rozanski, Robert D.; Medlock, James R., III; and Larson, Stephen F., to L.E.A. Dynatech. Uniform current and voltage distribution device. 4,875,137, Cl. 361-331.000.

Rozman, Christopher J.; Roe, Derrick I.; and Recker, Bradley J., to Sundstrand Corporation. Phase separation control. 4,875,149, Cl. 363-41.000.

Rozman, Christopher J.: *See*—
Roe, Derrick I.; Rozman, Christopher J.; and Recker, Bradley J., 4,875,148, Cl. 363-41.000.

Rubinshtein, Bernard, to Output Technology Corporation. Web feed tractor belt assembly. 4,874,121, Cl. 226-74.000.

Rudd, Robert E., III: *See*—
Spillman, William B., Jr.; Rudd, Robert E., III; Ellinger, Sylvester M.; Patriquin, Douglas R.; and Kline, Bruce R., 4,874,245, Cl. 356-364.000.

Rudenauer, Werner, to DIEHL GmbH & Co. Pyrotechnic fuze for projectiles, rockets, bomblets and mines. 4,873,927, Cl. 102-269.000.

Rudolph, Gert: *See*—
Borowski, Horst; Kausch, Erwin; Rittershaus, Erhard; Rudolph, Gert; and Schneider, Werner, 4,874,004, Cl. 131-364.000.

Rundo, John R., to B.F. Goodrich Company, The. Insulating a window pane. 4,873,803, Cl. 52-202.000.

Ruottu, Seppo, to A. Ahlstrom Osakeyhtio. Fluidized bed reactor. 4,874,584, Cl. 422-145.000.

Ruskin, Thomas R. Touch controlled multiple position lamp. 4,874,991, Cl. 315-362.000.

Rusmar Incorporated: *See*—
Kittle, Paul A., 4,874,641, Cl. 427-244.000.

Russell, Frank S.; and Hallihan, Timothy J., to Sleeper & Hartley Corp. Computer controlled coiling machine. 4,873,854, Cl. 72-12.000.

Russell, Ronald K., to Ortho Pharmaceutical Corporation. Ethanesulfonamide derivatives. 4,874,771, Cl. 514-331.000.

Russell, Stephen D., to United States of America, Army. Phase-conjugate resonator. 4,875,219, Cl. 372-92.000.

Russo, John L.; and Van der Kloot, Robert H., to Teradyne, Inc. Automatic circuit tester control system. 4,875,210, Cl. 371-27.000.

Ryan, Francis X.: *See*—
von Ballmoos, Roland; and Ryan, Francis X., 4,874,504, Cl. 208-111.000.

Ryan, Thomas W., III; Maymar, Milan J.; and Anderson, Orin M., to Southwest Research Institute. Variable compression ratio direct injection engine. 4,873,947, Cl. 123-78.00C.

Rydeen, Robert J., to R. J. Rydeen & Associates. Stressed skin post and beam building construction system. 4,873,797, Cl. 52-93.000.

Ryobi, Ltd.: *See*—
Murakami, Hideo, 4,874,144, Cl. 242-235.000.
S. C. Johnson & Son, Inc.: *See*—
Etter, Robert M.; and Neumiller, Phillip J., 4,874,672, Cl. 428-457.000.
Sramek, John A., 4,874,604, Cl. 424-47.000.
S.U.I. Corporation: *See*—
Silberstein, Ilan, 4,874,066, Cl. 188-280.000.
Sabetti, Anthony J.: *See*—
Bishop, Robert P.; Sabetti, Anthony J.; and Charboneau, Thomas, 4,875,135, Cl. 361-283.000.
Sachs/Freeman Associates, Inc.: *See*—
Kersey, Alan D., 4,874,244, Cl. 356-350.000.
Sachtler, J. W. Adriaan; and Lawson, R. Joe, to UOP. Catalyst for the isomerization of aromatics. 4,874,731, Cl. 502-66.000.
Sackett, Robert L.: *See*—
Johnson, Arthur F.; and Sackett, Robert L., 4,874,585, Cl. 422-171.000.
Sadai, Masanao: *See*—
Adachi, Kuniaki; Tamai, Hideo; and Sadai, Masanao, 4,874,791, Cl. 514-558.000.
SAES Getters S.p.A.: *See*—
Bratz, V. David, 4,874,339, Cl. 445-28.000.
Safranek, Edward J., to F & B Mfg. Co. High efficiency electrical alternator system. 4,873,962, Cl. 123-599.000.
Safranek, Edward J., to F & B Mfg. Co. Stator assembly having coil bobbins with retaining clips. 4,874,977, Cl. 310-269.000.
Sagawa, Yasuhiro: *See*—
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.
St. Clair, Martha H.: *See*—
Rideout, Janet L.; Barry, David W.; Lehrman, Sandra N.; St. Clair, Martha H.; and Furman, Phillip A., 4,874,609, Cl. 424-85.400.
Saint-Gobain Vitrage "Les Miroirs" : *See*—
Kuster, Hans-Werner; Radermacher, Herbert; and Vanaschen, Luc, 4,874,418, Cl. 65-348.000.
Saito, Haruo; Kranz, David M.; Eisen, Herman N.; and Tonegawa, Susumu, to Massachusetts Institute of Technology. T lymphocyte receptor subunit. 4,874,845, Cl. 530-395.000.
Saito, Shozo: *See*—
Igarashi, Takao; Sugawara, Satoshi; Yoshimoto, Yuichiro; Saito, Shozo; Fukumoto, Takashi; Endo, Zenichiro; and Shinbo, Katsutoshi, 4,874,574, Cl. 376-333.000.
Saito, Yasuo: *See*—
Hirata, Kimio; and Saito, Yasuo, 4,874,034, Cl. 165-9.100.
Saitoh, Izumi; Kido, Shigeru; Sasaki, Yoshio; and Shinohara, Syuichiro, to Shionogi & Co., Ltd.; and Nisshin Chemical Co., Ltd. Acrylic copolymer and skin protective. 4,874,830, Cl. 526-318.400.
Sakabe, Yukio: *See*—
Sano, Harunobu; Sakabe, Yukio; and Nishioka, Goro, 4,875,136, Cl. 361-321.000.
Sakai, Jun: *See*—
Sangyoji, Kazuo; Sakai, Jun; Hayashi, Shigeyuki; Suzuki, Makoto; and Kimura, Yasuo, 4,875,074, Cl. 355-27.000.
Sakai, Kazuo: *See*—
Utaka, Katsuyuki; Sakai, Kazuo; Matsushima, Yuichi; and Akiba, Shigeyuki, 4,874,216, Cl. 350-96.190.
Sakai, Nobuo: *See*—
Yamanouchi, Junichi; Ono, Shigetoshi; Hirano, Tsumoru; Watanabe, Toshiyuki; Sakai, Nobuo; and Mihayashi, Keiji, 4,874,689, Cl. 430-548.000.
Sakai, Shunji; Kitagawa, Tohru; Suzuki, Kunikazu; and Watanabe, Naohiro, to Oki Electric Industry Co., Ltd. Device for merging plural sensor outputs onto a single conductor. 4,875,099, Cl. 358-213.110.
Sakaida, Atsuo; Chikaoka, Yasuji; Imoto, Yasuo; Iriguchi, Akira; and Ikezaki, Yoshiyuki, to Brother Kogyo Kabushiki Kaisha. Device for magnifying displacement of piezoelectric element or the like and method of producing same. 4,874,978, Cl. 310-328.000.
Sakakibara, Kenji: *See*—
Ueda, Masashi; Horaguchi, Yoichi; and Sakakibara, Kenji, 4,875,073, Cl. 355-27.000.
Sakakibara, Toshiyuki: *See*—
Kinomura, Keisuke; Kitazawa, Sadaya; Takata, Yasushi; and Sakakibara, Toshiyuki, 4,874,852, Cl. 536-18.600.
Sakamoto, Hideo; and Tsugita, Hiroshi, to Sharp Kabushiki Kaisha. Method of testing semiconductor wafers. 4,875,002, Cl. 324-73.00R.
Sakamoto, Takaaki; Itoh, Munehiko; and Maeda, Shuji, to Matsushita Electric Works, Ltd. Method of preparing polyphenylene oxide composition and laminates using such compositions. 4,874,826, Cl. 525-534.000.
Sakamoto, Yasuhiko: *See*—
Hisaki, Masakatu; Kashima, Kenichi; Sakamoto, Yasuhiko; Hojo, Masakazu; Katayama, Osamu; and Hata, Hiroyoshi, 4,874,773, Cl. 514-355.000.
Sakano, Yukio, to Ricoh Company, Ltd. Two-dimensional memory unit having a 2d array of individually addressable blocks each having a 2d array of cells. 4,875,190, Cl. 365-189.040.
Sakata, Masakazu: *See*—
Tsujino, Yoshikazu; Hamada, Yuuji; Sakata, Masakazu; Fujii, Takanori; and Kuwano, Yukinori, 4,874,646, Cl. 428-34.100.
Sakayori, Hiroyuki: *See*—
Sato, Masahiko; Konuma, Toshimitsu; Odaka, Seiichi; Yamaguchi, Toshiharu; Watanabe, Toshio; Aoyagi, Osamu; Tabata, Kaoru; Isigaki, Chizuru; Sakayori, Hiroyuki; Kobayashi, Ippei; Osabe, Akio; and Yamazaki, Shunpei, 4,874,461, Cl. 156-633.000.
Sakazaki, Yoshihisa, to Kabushiki Kaisha Toshiba. Digital FM demodulating apparatus. 4,875,017, Cl. 329-336.000.
Sakui, Koji: *See*—
Momodomi, Masaki; and Sakui, Koji, 4,875,195, Cl. 365-230.080.
Sakurai, Shigeo; Umezawa, Sadao; Usami, Saburo; Miyata, Hiroshi; Toriya, Hajime; Tsubouchi, Kuniyoshi; and Kaneko, Ryoichi, to Hitachi, Ltd. Method and apparatus for estimating life expectancy of mechanical structures. 4,875,170, Cl. 364-507.000.
Sakurai, Takao: *See*—
Higuchi, Ryoichi; Sakurai, Takao; Yokota, Tadahiko; Mikami, Naoko; Yamamoto, Eri; and Takeuchi, Koji, 4,874,542, Cl. 252-299.610.
Sales S.p.A.: *See*—
Tessera-Chiesa, Emilio, 4,874,096, Cl. 206-621.000.
Sampath, Barbara A.; and Schenk, Richard C., to Xerox Corporation. Sheet edge detector. 4,874,958, Cl. 355-309.000.
Sampson, Thomas J. Tire wheel and wheel cover spray shield and kit. 4,874,206, Cl. 301-37.00R.
Samsung Semiconductor & Telecommunication Co., Ltd.: *See*—
Kim, Myung S.; Kang, Hyun S.; Lim, Soon K.; and Park, Hee K., 4,874,712, Cl. 437-31.000.
Sanada, Kei: *See*—
Mine, Kazuhiro; Sanada, Kei; and Ide, Mitsuteru, 4,874,980, Cl. 310-328.000.
Sanchez-Robles, Francisco B.; and Manterola, Maria De La Paloma M. Color dosification/applicaion machine. 4,874,131, Cl. 239-307.000.
Sanden Corporation: *See*—
Kobayashi, Hideto; and Terauchi, Kiyoshi, 4,874,295, Cl. 417-222.000.
Masuda, Kenji, 4,874,036, Cl. 165-42.000.
Matsushita, Takashi; and Yanai, Genzo, 4,874,973, Cl. 310-78.000.
Sander, Rainald: *See*—
Leipold, Ludwig; Sander, Rainald; Tihanyi, Jenoe; and Weber, Roland, 4,875,131, Cl. 361-103.000.
Sanders, Steven B. Electric heating load management control. 4,874,926, Cl. 219-486.000.
Sandoz Ltd.: *See*—
Henzi, Beat, 4,874,392, Cl. 8-662.000.
Sangyoji, Kazuo; Sakai, Jun; Hayashi, Shigeyuki; Suzuki, Makoto; and Kimura, Yasuo, to Brother Kogyo Kabushiki Kaisha. Image recording apparatus. 4,875,074, Cl. 355-27.000.
Sanki Electronic Industry Co., Ltd.: *See*—
Kawamura, Takeyoshi, 4,875,133, Cl. 361-230.000.
Sankoda, Tomoo: *See*—
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.
Sanner, Medford D., to Recognition Equipment Incorporated. Ambient illumination bar code reader. 4,874,933, Cl. 235-470.000.
Sano, Harunobu; Sakabe, Yukio; and Nishioka, Goro, to Murata Manufacturing Co., Ltd. Ceramic capacitor and method of manufacturing the same. 4,875,136, Cl. 361-321.000.
Sano, Koichi: *See*—
Maeda, Akira; Sano, Koichi; Yokoyama, Tetsuo; Koizumi, Hideaki; and Mizuno, Hirotaka, 4,875,012, Cl. 324-309.000.
Santel, Hans-Joachim: *See*—
Jelich, Klaus; Gayer, Herbert; Kramer, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,874,424, Cl. 71-105.000.
Wroblowsky, Heinz-Jurgen; Kluth, Joachim; Tietjen, Klaus-Gunther; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,874,420, Cl. 71-93.000.
Santhanam, K. S. V.: *See*—
O'Brien, R. N.; and Santhanam, K. S. V., 4,874,735, Cl. 502-159.000.
Sanyo Electric Co., Ltd.: *See*—
Tsujino, Yoshikazu; Hamada, Yuuji; Sakata, Masakazu; Fujii, Takanori; and Kuwano, Yukinori, 4,874,646, Cl. 428-34.100.
Sapp, William M.; and Harrell, Julia E., to Crown Crafts, Inc. Pillow structure. 4,873,736, Cl. 5-434.000.
Sartomer Company, Inc.: *See*—
Ceska, Gary W, 4,874,675, Cl. 428-521.000.
Sasaki, Saburo; Ishida, Tsutomu; and Yamamoto, Kenji, to Ricoh Company, Ltd.; and Ricoh Research Institute of General Electronics. Contact type image sensor. 4,874,957, Cl. 250-578.000.
Sasaki, Tetsuo: *See*—
Kashiwada, Ken; Muto, Tadanobu; and Sasaki, Tetsuo, 4,874,035, Cl. 165-38.000.
Sasaki, Yoshio: *See*—
Saitoh, Izumi; Kido, Shigeru; Sasaki, Yoshio; and Shinohara, Syuichiro, 4,874,830, Cl. 526-318.400.
Sasaki, Yoshiyuki; and Okamoto, Tetsuo, to Teijin Limited. Synthetic filament-reinforced polymer material sheet and process for producing the same. 4,874,658, Cl. 428-220.000.
Sato, Hiroshi: *See*—
Kushibe, Yuki; and Sato, Hiroshi, 4,874,309, Cl. 425-589.000.

Sato, Isao; Miyake, Nobuhiko; and Nishida, Souji, to Nippon Seiko Kabushiki Kaisha. Bearing device assembly. 4,874,259, Cl. 384-445.000.
Sato, Koichi: *See*—
Oka, Yoshinobu; and Sato, Koichi, 4,874,931, Cl. 235-379.000.
Sato, Makoto: *See*—
Umeda, Osamu; Nakakusu, Tohru; Sato, Makoto; and Shimazaki, Tatsuo, 4,875,064, Cl. 353-78.000.
Sato, Masahiko; Konuma, Toshimitsu; Odaka, Seiichi; Yamaguchi, Toshiharu; Watanabe, Toshio; Aoyagi, Osamu; Tabata, Kaoru; Isigaki, Chizuru; Sakayori, Hiroyuki; Kobayashi, Ippei; Osabe, Akio; and Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Method for manufacturing liquid crystal device with spacers formed by photolithography. 4,874,461, Cl. 156-633.000.
Sato, Tadashi: *See*—
Ueda, Kouichiro; Tanaka, Satoru; Kunii, Toshinobu; Kagei, Kengo; Sato, Tadashi; Ono, Hideki; Ohtsuka, Issei; Kawase, Mayumi; Ohgoh, Toshiharu; and Wakabayashi, Tsuneo, 4,874,869, Cl. 548-309.000.
Sato, Takanori, to Shimizu Construction Co., Ltd. Apparatus for suppressing vibration of structure. 4,873,798, Cl. 52-167.0DF.
Sato, Tsunehiko: *See*—
Komatsu, Kazunori; Chikamasa, Hiroshi; and Sato, Tsunehiko, 4,874,633, Cl. 427-48.000.
Satou, Takeo; and Shimizu, Yasuhiko, to Kabushiki Kaisha Toshiba. Die-bonding method and apparatus therefor. 4,874,444, Cl. 156-64.000.
Sauer, Gerhard: *See*—
Huth, Andreas; Sauer, Gerhard; and Wachtel, Helmut, 4,874,768, Cl. 514-288.000.
Sauer, Joe D.: *See*—
Smith, Kim R.; Borland, James E.; and Sauer, Joe D., 4,874,784, Cl. 514-517.000.
Smith, Kim R.; Borland, James E.; and Sauer, Joe D., 4,874,785, Cl. 514-526.000.
Smith, Kim R.; Borland, James E.; and Sauer, Joe D., 4,874,788, Cl. 514-534.000.
Smith, Kim R.; Borland, James E.; and Sauer, Joe D., 4,874,789, Cl. 514-551.000.
Saulnier, Mark G.: *See*—
Vyas, Dolatrai M.; Saulnier, Mark G.; and Kadow, John F., 4,874,851, Cl. 536-17.200.
Savenije, Franciscus G., to Auping B.V. Fluid filled mattress with height measuring and control devices. 4,873,737, Cl. 5-453.000.
Savino, Carolyn A., to Nalco Chemical Company. Paper making filler composition and method. 4,874,466, Cl. 162-164.300.
Sawasaki, Yoshihiko: *See*—
Sonoda, Sakae; Hetsugi, Kouji; Sawasaki, Yoshihiko; Kaburagi, Kouji; and Matsushima, Yasunobu, 4,874,480, Cl. 204-56.100.
Sawayama, Noboru: *See*—
Bisaiji, Takashi; Sawayama, Noboru; and Yoo, Hideo, 4,875,079, Cl. 355-246.000.
Sawtell, Ralph R.; Bretz, Philip E.; and Jensen, Craig L., to Aluminum Company of America. Superplastic aluminum products and alloys. 4,874,440, Cl. 148-437.000.
Sazhin, Alexandr D.: *See*—
Dzjuban, Vitaly S.; Sazhin, Alexandr D.; Zhitnikov, Valery K.; and Konoplyanko, Anatoly I., 4,875,040, Cl. 340-825.060.
Sbaschnigg, Johann; and Petschauer, Franz, to Maschinenfabrik Andritz Actiengesellschaft. Apparatus for the liquid treatment of a fibrous board between two endless foraminous belts or wires. 4,874,468, Cl. 162-300.000.
Scaglietti, Oscar, to Ferrari Engineering S.p.A. Support and guide structure for the windows of a motor vehicle body. 4,874,201, Cl. 296-201.000.
Scazzosi, Adriano: *See*—
Rescalli, Carlo; Ricci, Riziero; Scazzosi, Adriano; and Cianci, Flavio, 4,874,474, Cl. 203-18.000.
Schaefer, Helmut: *See*—
Schaefer, Philipp; and Schaefer, Helmut, 4,874,449, Cl. 156-246.000.
Schaefer, Philipp; and Schaefer, Helmut, to Schaefer, Philipp. Process for dressing a substantially flat substrate such as split leather or a textile material. 4,874,449, Cl. 156-246.000.
Schafer, Wolfgang: *See*—
Yong, Bak G.; Petra, Barth; Dietrich, Demus; Detlev, Joachimi; Kampa, Barbara; Kohler, Saskia; Mohr, Kristine; Paschke, Reinhard; Pelzl, Gerhard; Rosenfeld, Ulrich; Schafer, Wolfgang; Scherf, Klaus-Dieter; Tschirske, Carsten; Weissflog, Wolfgang; and Zaschke, Horst, 4,874,544, Cl. 252-299.610.
Schaldach, Max, to Mess-und Therapiegerate GbmH & Co. Heart pacemaker. 4,873,980, Cl. 128-419.000.
Schaufeld, Fredrick, to National Electronics Warranty Corporation. Insurance form packet. 4,874,187, Cl. 283-70.000.
Scheier, Donald J.; and Hathorn, Jack L., to Simon-Johnson Company. Method and apparatus for removing breast meat from poultry carcass. 4,873,746, Cl. 17-11.000.
Schenk, Richard C.: *See*—
Sampath, Barbara A.; and Schenk, Richard C., 4,874,958, Cl. 355-309.000.
Scherer Healthcare Ltd.: *See*—
Marshall, Lyman R., 4,873,997, Cl. 128-849.000.
Scherf, Klaus-Dieter: *See*—
Yong, Bak G.; Petra, Barth; Dietrich, Demus; Detlev, Joachimi; Kampa, Barbara; Kohler, Saskia; Mohr, Kristine; Paschke, Reinhard; Pelzl, Gerhard; Rosenfeld, Ulrich; Schafer, Wolfgang; Scherf, Klaus-Dieter; Tschirske, Carsten; Weissflog, Wolfgang; and Zaschke, Horst, 4,874,544, Cl. 252-299.610.
Schering Aktiengesellschaft: *See*—
Hasse, Peter; Kosikowski, Thomas; and Steger, Horst, 4,874,479, Cl. 204-27.000.
Huth, Andreas; Sauer, Gerhard; and Wachtel, Helmut, 4,874,768, Cl. 514-288.000.
Schirmacher, Manfred, 4,874,015, Cl. 137-637.050.
Scherowsky, Gunter: *See*—
Heppke, Gerd; Scherowsky, Gunter; Bahr, Christian; and Lehmann, Lutz, 4,874,545, Cl. 252-299.610.
Schipper, John F.: *See*—
Watts, Michael P. C.; Perera, Thiloma I.; Myers, David W.; Ozaraki, Robert G.; Schipper, John F.; and Tan, Raul V., 4,874,240, Cl. 356-73.000.
Schipper, Paul H.: *See*—
Herbst, Joseph A.; Owen, Hartley; and Schipper, Paul H., 4,874,503, Cl. 208-67.000.
Schirmacher, Manfred, to Schering Aktiengesellschaft. Monitoring system. 4,874,015, Cl. 137-637.050.
Schlameus, Herman W.: *See*—
Wilson, Wilfred W.; Polemenakos, Sotiros C.; Potter, J. Larry; Mangold, Donald J.; Harlowe, William W.; and Schlameus, Herman W., 4,874,611, Cl. 424-410.000.
Schleicher & Schuell GmbH: *See*—
Chakraborty, Asok; Urlaub, Herbert; Grof, Franz; and Cosack, Klaus, 4,874,513, Cl. 210-321.840.
Schlesinger, Ulrich: *See*—
Back, Gerhard; Beffa, Fabio; Schlesinger, Ulrich; and Puntener, Alois, 4,874,849, Cl. 534-696.000.
Schlick, Erich: *See*—
Brana, Miguel F.; Berlanga, Jose M. C.; Keilhauer, Gerhard; and Schlick, Erich, 4,874,863, Cl. 540-99.000.
Schlipp, Richard H.: *See*—
Dewberry, Larry S.; and Schlipp, Richard H., 4,873,747, Cl. 17-11.10R.
Schloemer, George C.: *See*—
Fleming, Michael P.; Schloemer, George C.; and Khatri, Hiralal N., 4,874,871, Cl. 548-543.000.
Fleming, Michael P.; Khatri, Hiralal N.; and Schloemer, George C., 4,874,872, Cl. 548-531.000.
Schmid, Karl-Heinz; Penninger, Josef; and Moeller, Hinrich, to Henkel Kommanditgesellschaft auf Aktien. Acylated 3-amino-1,2,4-triazoles as corrosion inhibitors for non-ferrous metals. 4,874,579, Cl. 422-16.000.
Schmidt, Laurie H. Dispensers for cosmetics. 4,874,113, Cl. 222-143.000.
Schmidt, Robert R.: *See*—
Jelich, Klaus; Gayer, Herbert; Kramer, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,874,424, Cl. 71-105.000.
Wroblowsky, Heinz-Jurgen; Kluth, Joachim; Tietjen, Klaus-Guenther; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,874,420, Cl. 71-93.000.
Schmidt, Thomas: *See*—
Gallenkamp, Bernd; Gunther, Andreas; Mohrmann, Karl-Heinrich; and Schmidt, Thomas, 4,874,860, Cl. 544-221.000.
Schneider, Bernhard: *See*—
Gruenhoff, Ulrich; and Schneider, Bernhard, 4,874,615, Cl. 426-15.000.
Schneider, Kurt: *See*—
Hoelderich, Wolfgang; Hupfer, Leopold; and Schneider, Kurt, 4,874,899, Cl. 568-386.000.
Schneider, Werner: *See*—
Borowski, Horst; Kausch, Erwin; Rittershaus, Erhard; Rudolph, Gert; and Schneider, Werner, 4,874,004, Cl. 131-364.000.
Schneidmiller, Rodney G. Entry structure for flexible bag type insect trap. 4,873,787, Cl. 43-122.000.
Schnell, Kenneth R.; and Kesler, Gregory J., to Hubbell Incorporated. Cable clamps for electrical box. 4,874,905, Cl. 174-65.00R.
Schnur, Rodney C.; and Fliri, Anton F. J., to Pfizer Inc. Benzamide protease inhibitors. 4,874,864, Cl. 546-153.000.
Schnyder & Cie: *See*—
Wust, Robert, 4,873,771, Cl. 33-802.000.
Scholz, Thomas H.: *See*—
Graham, Samuel L.; and Scholz, Thomas H., 4,874,870, Cl. 548-336.000.
Schorr, Hans P.: *See*—
Dessanti, Daniel J.; and Schorr, Hans P., 4,873,839, Cl. 62-238.600.
Schoumaker, Raoul J. P.: *See*—
Boundy, Bruce K.; and Schoumaker, Raoul J. P., 4,874,027, Cl. 160-230.000.
Schram, Joseph G.: *See*—
Goffe, William L.; and Schram, Joseph G., 4,875,081, Cl. 355-303.000.
Schreiber, Saul N. Surgical fasteners and method. 4,873,976, Cl. 128-334.00R.
Schrock, Donald C.: *See*—
Pickerrell, Daniel A.; Schrock, Donald C.; and Turner, Larry G., 4,874,009, Cl. 137-454.600.
Schubert, Axel: *See*—
Freidank, Michael; Coym, Jurgen; and Schubert, Axel, 4,873,970, Cl. 128-202.220.

Schultz, Peter C.: *See—*
Vacha, Lubos J. B.; Schultz, Peter C.; Moynihan, Cornelius T.; Raychaudhuri, Satyabrata; Cadien, Ken C.; Harbison, Barry B.; and Mossadegh, Reza, 4,874,222, Cl. 350-96.340.

Schulz, Richard H. Freezer bag supporting stand. 4,874,141, Cl. 248-97.000.

Schulze, Eckehart, to Hartmann & Lammle GmbH & Co. KG. Hydraulic driving arrangement. 4,873,912, Cl. 91-389.000.

Schuren, John G.: *See—*
Lauritzen, Ann M.; Baker, David S.; Christiansen, Margot H.; Johnson, Beamon M.; and Schuren, John G., 4,874,879, Cl. 549-536.000.

Schwabe, Ulrich: *See—*
Neppl, Franz; and Schwabe, Ulrich, 4,874,717, Cl. 437-59.000.

Schwartz, Alexander: *See—*
Ishak, Maher; and Schwartz, Alexander, 4,874,478, Cl. 204-16.000.

Schwartz, Ulrich: *See—*
Arlt, Dieter; Schwartz, Ulrich; Brandt, Hans-Walter; Arlt, Wolfgang; and Nickel, Andreas, 4,874,473, Cl. 203-1.000.

Schwarz, Werner: *See—*
Fleer, Ernst O.; Landgraf, Hermann; and Schwarz, Werner, 4,874,314, Cl. 433-129.000.

Schwender, Charles F.: *See—*
Carethers, Mary E.; Centenko, Wiaczeslaw A.; Connor, David T.; Johnson, Elizabeth A.; Kiely, John S.; Schwender, Charles F.; Sircar, Jagadish C.; Sorenson, Roderick J.; Unangst, Paul C.; and Bruns, Robert F., 4,874,758, Cl. 514-226.500.
Sircar, Jagadish C.; Brungardt, Catherine R.; and Schwender, Charles F., 4,874,862, Cl. 544-276.000.

Schwenninger, Ronald L., to PPG Industries, Inc. Refractory clad lid for heating vessel. 4,874,313, Cl. 432-247.000.

Schwerdtel, Ernst; and Lang, Hans-Jorg, to Ludwig Schwerdtel GmbH. Filling station for a cartridge filling and sealing machine. 4,874,022, Cl. 141-165.000.

Schwertfeger, Werner: *See—*
Kruse, Alfred; Siegemund, Gunter; and Schwertfeger, Werner, 4,874,557, Cl. 562-851.000.

Schwier, Chris E.; and Wu, Wan C., to Monsanto Company. Process for preparing α-methylstyrene-acrylonitrile polymers. 4,874,829, Cl. 526-262.000.

Scott, James A.: *See—*
Thompson, Marvin W.; Jennings, Timothy C.; Scott, James A.; Phenicie, Ronald W.; Murphy, Margaret H.; Nakash, Gabriel D.; Biggers, James R.; Boudreau, Lynnlee M.; and Curiel Contreras, Jorge H., 4,874,266, Cl. 403-407.100.

Scott, John Campbell; and Shattuck, Meredith D., to International Business Machines Corporation. Organic photoconductors with reduced fatigue. 4,874,682, Cl. 430-59.000.

Scott, Ray V., Jr.: *See—*
House, David W.; and Scott, Ray V., Jr., 4,874,831, Cl. 528-48.000.

Scott, Raymond P. W.; and Katz, Elena, to Perkin-Elmer Corporation, The. Ionization detectors for gas chromatography. 4,873,862, Cl. 73-23.100.

Seaborne, Jonathan; and Egbert, David C., to General Mills, Inc. Package containing a moisture resistant edible internal barrier. 4,874,618, Cl. 426-76.000.

Secor, Jacob: *See—*
Kleschick, William A.; Secor, Jacob; and Holmsen, Theodore W., 4,874,421, Cl. 71-9.00H.

Seemann, Howard; and Gottschlich, Chad F., to Selas Corporation of America. Low NOX burner. 4,874,310, Cl. 431-8.000.

Segawa, Machio, to NEC Corporation. Semiconductor memory with improved cell arrangement. 4,875,193, Cl. 365-207.000.

Seiko Instruments Inc.: *See—*
Nakagawa, Yoshitomo; and Yamaoka, Takehiro, 4,874,460, Cl. 156-626.000.
Nakagawa, Yoshitomo; Kaito, Takashi; Houjyo, Hisao; and Yamamoto, Masahiro, 4,874,632, Cl. 427-41.000.
Namiki, Masayuki; Gouda, Masanori; and Kamiya, Masaaki, 4,875,011, Cl. 324-251.000.

Seipenbusch, Reinhold, to Huels Aktiengesellschaft. Process for the production of L-malic acid. 4,874,700, Cl. 435-145.000.

Seipp III, Edwin A.: *See—*
Groswith III, Charles T.; Seipp III, Edwin A.; Sun, Rickson; and Yurchenco, James R., 4,874,186, Cl. 281-28.000.

Sekiguchi, Seizo: *See—*
Kasai, Tomoaki; and Sekiguchi, Seizo, 4,873,847, Cl. 68-178.000.

Selas Corporation of America: *See—*
Seemann, Howard; and Gottschlich, Chad F., 4,874,310, Cl. 431-8.000.

Selby, Steven F.: *See—*
Klein, Frank H.; Selby, Steven F.; and Klueger, Sigmund, 4,874,110, Cl. 220-241.000.

Semec, Inc.: *See—*
Arefinejad, Majid; Brothers, Dennis J.; and Kosinski, Frederick, 4,874,205, Cl. 297-379.000.

Semiconductor Energy Laboratory Co., Ltd.: *See—*
Sato, Masahiko; Konuma, Toshimitsu; Odaka, Seiichi; Yamaguchi, Toshiharu; Watanabe, Toshio; Aoyagi, Osamu; Tabata, Kaoru; Isigaki, Chizuru; Sakayori, Hiroyuki; Kobayashi, Ippei; Osabe, Akio; and Yamazaki, Shunpei, 4,874,461, Cl. 156-633.000.
Yamazaki, Shunpei; Itoh, Kenji; and Nagayama, Susumu, 4,874,920, Cl. 219-121.850.

Sengoku, Koji; and Nagatome, Yoshiaki, to House Food Industries, Co. Process for producing retort bean curds. 4,874,630, Cl. 426-634.000.

Senter, Peter D., to Bristol-Myers Company. Mitomycin phosphate derivatives. 4,874,779, Cl. 514-410.000.

Seo, Iwao: *See—*
Oda, Kyoko; Takahasi, Kunimasa; and Seo, Iwao, 4,874,598, Cl. 423-598.000.

Servetus Partnership: *See—*
Lindemann, Peer; and Haughton, Victor M., 4,874,382, Cl. 604-195.000.

SGS Microelettronica S.p.A.: *See—*
Campardo, Giovanni; and Novosel, David, 4,874,965, Cl. 307-272.300.

SGS-Thomson Microelectronics s.r.l.: *See—*
Daniele, Vincenzo; Monti, Marco M.; Taliercio, Michele; and Capocelli, Piero, 4,875,020, Cl. 330-307.000.

Shah, Govind: *See—*
Chandler, Donald G.; Batterman, Eric P.; and Shah, Govind, 4,874,936, Cl. 235-494.000.

Shandon Scientific Limited: *See—*
Gordon, Alan J.; and Billington, Donald G., 4,874,582, Cl. 422-102.000.

Shanoilo, Semen M.: *See—*
Petrov, Vyacheslav V.; Gorshkov, Nikolai V.; Antonov, Alexandr A.; Tokar, Alexandr P.; Krjuchin, Andrei A.; and Shanoilo, Semen M., 4,875,204, Cl. 369-100.000.

Sharp Kabushiki Kaisha: *See—*
Izumitani, Masayoshi; and Soga, Akihiro, 4,873,811, Cl. 53-138.00A.
Ohnishi, Kazuyuki; Mori, Yoshiteru; and Okuda, Masakiyo, 4,875,072, Cl. 355-23.000.
Sakamoto, Hideo; and Tsugita, Hiroshi, 4,875,002, Cl. 324-73.00R.
Washizuka, Isamu; Inoue, Yukihiro; and Okajima, Yoshio, 4,875,036, Cl. 340-784.000.
Yamamoto, Kazushi, 4,874,160, Cl. 271-227.000.

Sharp Microelectronic Technology, Inc.: *See—*
Spaderna, Dieter W.; and Miller, Jeffrey L., 4,875,196, Cl. 365-238.000.

Shattuck, Meredith D.: *See—*
Scott, John Campbell; and Shattuck, Meredith D., 4,874,682, Cl. 430-59.000.

Shaw, David T.; Witanachchi, Sarath; and Kwok, Hoi-Sing, to Research Foundation of State University of New York, The. Non-enhanced laser evaporation of oxide superconductors. 4,874,741, Cl. 505-1.000.

Sheeran, Mary A.: *See—*
DiSapio, Alfred J.; Pfister, William R.; and Sheeran, Mary A., 4,874,129, Cl. 239-36.000.

Shell Internationale Research Maatschappij B.V.: *See—*
Honders, Anthonie; Horstik, Alfred J.; and Van Eyden, Gerbrand J. M., 4,874,482, Cl. 204-60.000.

Shell Oil Company: *See—*
Bickelhaupt, Friedrich; and van der Does, Thomas, 4,874,897, Cl. 568-13.000.
Boxhoorn, Gosse, 4,874,739, Cl. 502-218.000.
Drent, Eit, 4,874,736, Cl. 502-165.000.
George, Eric R.; Danforth, Richard L.; and Byrd, Paul S., 4,874,801, Cl. 523-214.000.
George, Eric R.; Lutz, Robert G.; and Smutny, Edgar J., 4,874,819, Cl. 525-185.000.
Gergen, William P., 4,874,825, Cl. 525-425.000.
Heitz, Walter L., 4,874,397, Cl. 48-210.000.
Job, Robert C., 4,874,737, Cl. 502-171.000.
Kershaw, Jacqueline A., 4,874,833, Cl. 528-90.000.
Klazinga, Aan H., 4,874,729, Cl. 502-61.000.
Klazinga, Aan Hendrik, 4,874,730, Cl. 502-61.000.
Lauritzen, Ann M.; Baker, David S.; Christiansen, Margot H.; Johnson, Beamon M.; and Schuren, John G., 4,874,879, Cl. 549-536.000.
Vogel, Jacobus E., 4,874,402, Cl. 55-22.000.

Shen, Chi-Cheong: *See—*
Malhi, Satwinder D. S.; Shen, Chi-Cheong; Bean, Kenneth E.; and Chang, Peng-Heng, 4,875,086, Cl. 357-54.000.

Shepard, Robert: *See—*
Bradshaw, William; and Shepard, Robert, 4,873,841, Cl. 62-239.000.

Sheridan, Michael; and Jaffe, Kenneth, to Ethylene Corp. Chemical process sampler. 4,873,876, Cl. 73-863.860.

Sheridan, Stephen E., to Brunswick Corporation. Marine engine with louvered flywheel cover shroud. 4,874,959, Cl. 290-1.00B.

Sherwood Medical Company: *See—*
Moran, John P.; Gilson, Richard W.; and Heubel, Thomas W., 4,874,385, Cl. 604-208.000.

Shibano, Yasuji, to Brother Kogyo Kabushiki Kaisha. Connector. 4,874,323, Cl. 439-260.000.

Shibata, Ryoichi; and Kasakoshi, Toshiyuki, to Hitachi Metals, Ltd. Heating roll for fixing toner. 4,874,927, Cl. 219-469.000.

Shiina, Jun: *See—*
Nasu, Tetsuji; and Shiina, Jun, 4,874,200, Cl. 296-197.000.

Shimada, Junichi: *See—*
Ito, Toshiyasu; Minoura, Jun; Mori, Takaaki; Takahashi, Shigeyuki; Kato, Mamoru; Shimada, Junichi; and Hayakawa, Fujio, 4,874,229, Cl. 350-357.000.

Shimada, Satoru: *See—*
Chikuma, Isamu; Shimada, Satoru; and Eda, Hiroshi, 4,874,183, Cl. 280-91.000.

Shimamori, Tamotsu: *See—*
Nakamura, Hideaki; Shimamori, Tamotsu; and Murashige, Shinichi, 4,875,016, Cl. 328-26.000.

Shimamura, Tooru: *See*—
Oku, Seiji; Shimamura, Tooru; Naganawa, Kazutomo; and Tanamura, Toshiya, 4,875,042, Cl. 340-870.170.
Shimano Industrial Company Limited: *See*—
Hitomi, Yasuhiro, 4,874,140, Cl. 242-223.000.
Nagano, Masashi, 4,873,890, Cl. 74-594.400.
Shimazaki, Tatsuo: *See*—
Umeda, Osamu; Nakakusu, Tohru; Sato, Makoto; and Shimazaki, Tatsuo, 4,875,064, Cl. 353-78.000.
Shimazaki, Toshio: *See*—
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.
Shimizu Construction Co., Ltd.: *See*—
Sato, Takanori, 4,873,798, Cl. 52-167.0DF.
Shimizu, Makoto: *See*—
Maeno, Mikihiko; Ohta, Yukio; Momiyama, Yoshiharu; Ono, Hisao; Takahata, Katsumasa; Ozono, Kazuyuki; Shimizu, Makoto; and Yamamoto, Mikio, 4,874,159, Cl. 271-171.000.
Shimizu, Toshihiko; Hotta, Masao; and Maio, Kenji, to Hitachi, Ltd. Two-step parallel analog to digital converter. 4,875,048, Cl. 341-156.000.
Shimizu, Yasuhiko: *See*—
Satou, Takeo; and Shimizu, Yasuhiko, 4,874,444, Cl. 156-64.000.
Shimokoriyama, Makoto; Yamashita, Shinichi; Abe, Naoto; Kashida, Motokazu; Takei, Masahiro; and Takahashi, Koji, to Canon Kabushiki Kaisha. Information data transmission system. 4,875,090, Cl. 358-12.000.
Shin-Etsu Chemical Co., Ltd.: *See*—
Yokokawa, Kiyoshi; and Koya, Kazuo, 4,874,416, Cl. 65-3.120.
Shin-Etsu Polymer Co., Ltd.: *See*—
Tahara, Kazutoki; and Egawa, Toshihiko, 4,874,671, Cl. 428-447.000.
Shinbo, Katsutoshi: *See*—
Igarashi, Takao; Sugawara, Satoshi; Yoshimoto, Yuichiro; Saito, Shozo; Fukumoto, Takashi; Endo, Zenichiro; and Shinbo, Katsutoshi, 4,874,574, Cl. 376-333.000.
Shindo, Masamichi: *See*—
Kato, Toshihiro; Shindo, Masamichi; and Fukasawa, Yoshihito, 4,874,956, Cl. 250-560.000.
Shino, Masami; Takano, Hideaki; Nakata, Jitsuo; and Noro, Katsuhiko, to Kyodo Oxygen Co., Ltd. Production process of xenon. 4,874,592, Cl. 423-262.000.
Shinohara, Syuichiro: *See*—
Saitoh, Izumi; Kido, Shigeru; Sasaki, Yoshio; and Shinohara, Syuichiro, 4,874,830, Cl. 526-318.400.
Shinwa Sangyo Co., Ltd.: *See*—
Kashiwada, Ken; Muto, Tadanobu; and Sasaki, Tetsuo, 4,874,035, Cl. 165-38.000.
Shiomi, Yasushi; Matsuzaki, Tokuo; and Masunaga, Katsuro, to UBE Industries, Ltd. Process for the preparation of a diester of oxalic acid. 4,874,888, Cl. 560-204.000.
Shionogi & Co., Ltd.: *See*—
Saitoh, Izumi; Kido, Shigeru; Sasaki, Yoshio; and Shinohara, Syuichiro, 4,874,830, Cl. 526-318.400.
Shionogi and Co., Ltd. Patent Department: *See*—
Takeda, Ken'ichi; and Horibe, Isao, 4,874,898, Cl. 568-369.000.
Shiota, Kazuo, to Fuji Photo Film Co. Ltd. Shading correcting apparatus for photographic printer. 4,875,071, Cl. 355-20.000.
Shiota, Tsuneo: *See*—
Hongo, Akihito; Shiota, Tsuneo; Nishida, Shigeo; Miyagi, Mitsunobu; and Wagatsuma, Yoshihiko, 4,875,218, Cl. 372-64.000.
Shirai, Miyuki; and Nogami, Akira, to Konishiroku Photo Industry Co., Ltd. Liquid developer for electrophotography. 4,874,683, Cl. 430-114.000.
Shirasawa, Hounai: *See*—
Sugimura, Keijiro; Sugimoto, Shunjiro; and Shirasawa, Hounai, 4,874,697, Cl. 435-68.000.
Shiroshita, Hirotaka: *See*—
Kubodera, Takayuki; Nakamura, Shizuo; Onizawa, Masanori; Shiroshita, Hirotaka; Mochizuki, Eiichi; Tsujimura, Masao; Atsuta, Toshikatsu; and Morooka, Takayoshi, 4,875,065, Cl. 354-82.000.
Shivers, Charles C.; and Arnold, Alvin. Grass trimmer. 4,873,819, Cl. 56-17.500.
Shook, Hal C.; and Holland, Carmon D., to CFC Fabrication Corporation. Apparatus for stripping concrete forms from bridge structures. 4,873,738, Cl. 14-1.000.
Shotey, Michael J. Plug enclosing outlet cover. 4,874,906, Cl. 174-67.000.
Shoup, Thomas A.: *See*—
Hunt, Thomas J.; Miller, James G.; Thomas, Lewis J., III; Melton, Hewlett E., Jr.; and Shoup, Thomas A., 4,873,984, Cl. 128-660.070.
Showa Denko Kabushiki Kaisha: *See*—
Hasumoto, Toshiharu; Kashiwada, Kunio; Konishi, Minoru; and Fujishiro, Nobuo, 4,874,403, Cl. 55-55.000.
Showscan Film Corporation: *See*—
Trumbull, Douglas; Collins, David; Smith, Wayne; and Spieldiener, Robert, 4,874,162, Cl. 272-18.000.
Shroot, Braham; Eustache, Jacques; Bernardon, Jean-Michel; and Nedoncelle, Philippe, to Centre International de Recherches Dermatologiques (CIRD). Polycyclic heterocyclic compounds, a process for their preparation and their use in human and veterinary medicine. 4,874,747, Cl. 514-23.000.
Shturman, Leonid: *See*—
Comben, Richard H.; Gilman, Byron L.; and Shturman, Leonid, 4,874,371, Cl. 604-95.000.
Shumway, Mark P. Telephone power distribution and isolation system. 4,875,232, Cl. 379-413.000.
Shurtliff, Jeffrey L.; and Thomas, Michael E., to United States of America, Air Force. Holder for milling countersink filler plugs. 4,873,794, Cl. 51-227.00R.
Sias, Stacey R.: *See*—
Andrews, William H.; Brothers, Virginia M.; Files, James G.; Kuhn, Irene; McCaman, Michael T.; Paul, Leland S.; Sias, Stacey R.; Gore, Thomas C.; Newman, Karel Z., Jr.; and Tedesco, John L., 4,874,705, Cl. 435-252.330.
Sickinger Company: *See*—
Pfaffle, Ernst, 4,874,279, Cl. 412-39.000.
Siegel, Heinz, to Robert Bosch GmbH. Anti-skid control system. 4,874,208, Cl. 303-116.000.
Siegel, Paul F.: *See*—
Spitzer, Charles M.; and Siegel, Paul F., 4,874,209, Cl. 312-250.000.
Siegemund, Gunter: *See*—
Kruse, Alfred; Siegemund, Gunter; and Schwertfeger, Werner, 4,874,557, Cl. 562-851.000.
Siemens Aktiengesellschaft: *See*—
Draxelmayr, Dieter, 4,875,018, Cl. 330-288.000.
Fleer, Ernst O.; Landgraf, Hermann; and Schwarz, Werner, 4,874,314, Cl. 433-129.000.
Foell, Helmut; and Lehmann, Volker, 4,874,484, Cl. 204-129.300.
Hagemeyer, Friedrich-Wilhelm, 4,875,181, Cl. 364-716.000.
Hagen, Uwe; and Redler, Udo, 4,873,973, Cl. 128-303.130.
Hagen, Uwe; and Redler, Udo, 4,873,974, Cl. 128-303.130.
Hunold, Michael, 4,875,225, Cl. 378-99.000.
Kappeler, Franz; Wolf, Thomas; and Stegmueller, Bernhard, 4,875,217, Cl. 372-50.000.
Krueger, Hans; and Welsch, Wolfgang, 4,875,220, Cl. 372-107.000.
Leipold, Ludwig; Sander, Rainald; Tihanyi, Jenoe; and Weber, Roland, 4,875,131, Cl. 361-103.000.
Neppl, Franz; and Schwabe, Ulrich, 4,874,717, Cl. 437-59.000.
Siemens-Bendix Automotive Electronics Limited: *See*—
DeJong, Allan W.; and Perry, Paul D., 4,874,010, Cl. 137-484.400.
Siemens Telecomunicazioni S.p.A.: *See*—
Buoli, Carlo, 4,875,025, Cl. 333-230.000.
Sierracin Corporation: *See*—
Voss, David L.; DeCamp, Howard S.; and Culp, Gordon W., 4,874,930, Cl. 219-522.000.
Sigai, A. Gary; Lapatovich, Walter P.; and Alexander, Michael N., to GTE Laboratories Incorporated. Fluorescent lamp based on a phosphor excited by a molecular discharge. 4,874,984, Cl. 313-486.000.
Sigma, Incorporated: *See*—
Nakamura, Kikuo, 4,874,172, Cl. 273-143.00R.
Signode System GmbH: *See*—
Warych, Hans, 4,874,095, Cl. 206-586.000.
Silberstein, Ilan, to S.U.I. Corporation. Variable flow shock absorber and method. 4,874,066, Cl. 188-280.000.
Silicon Connections Corporation: *See*—
Burke, Gary R., 4,875,003, Cl. 324-73.00R.
Simeth, Claus; and Gensheimer, Valentin, to MAN Poland Druckmaschinen AG. Clamping gripper with resultant force through contact point. 4,873,926, Cl. 101-409.000.
Simmonds Precision Products, Inc.: *See*—
Spillman Jr., William B., 4,874,941, Cl. 250-237.00G.
Spillman, William B., Jr.; Rudd, Robert E., III; Ellinger, Sylvester M.; Patriquin, Douglas R.; and Kline, Bruce R., 4,874,245, Cl. 356-364.000.
Simon, Hubert: *See*—
Mulhaupt, Rolf; and Simon, Hubert, 4,874,805, Cl. 524-188.000.
Simon-Johnson Company: *See*—
Scheier, Donald J.; and Hathorn, Jack L., 4,873,746, Cl. 17-11.000.
Simpson, Hugo R., to British Aerospace plc. Asynchronous communication systems. 4,875,224, Cl. 375-118.000.
Sircar, Jagadish C.; Brungardt, Catherine R.; and Schwender, Charles F., to Warner-Lambert Company. Process for preparing guanine derivatives. 4,874,862, Cl. 544-276.000.
Sircar, Jagadish C.: *See*—
Carethers, Mary E.; Centenko, Wiaczeslaw A.; Connor, David T.; Johnson, Elizabeth A.; Kiely, John S.; Schwender, Charles F.; Sircar, Jagadish C.; Sorenson, Roderick J.; Unangst, Paul C.; and Bruns, Robert F., 4,874,758, Cl. 514-226.500.
Siwiak, Kazimierz; Jasinski, Leon; and Steel, Francis R., to Motorola, Inc. Frequency division multiplexed acknowledge back paging system. 4,875,038, Cl. 340-825.440.
Skaugen, Borgeir, to Beloit Corporation. Papermaking press section and transfer arrangement to dryer section. 4,874,470, Cl. 162-360.100.
Skidmore, Jay A.: *See*—
Coldren, Larry A.; and Skidmore, Jay A., 4,874,459, Cl. 156-643.000.
Skinner, Bruce A. J. Biopsy needle. 4,873,991, Cl. 128-754.000.
Skudrzyk, Joseph: *See*—
Mendenhall, Abraham H.; Irace, Joseph F.; and Skudrzyk, Joseph, 4,874,620, Cl. 426-113.000.
Slater, Glenn L.: *See*—
Zdeb, Brian; Pearson, Steve; and Slater, Glenn L., 4,874,366, Cl. 604-56.000.

Sleeper & Hartley Corp.: *See*—
Russell, Frank S.; and Hallihan, Timothy J., 4,873,854, Cl. 72-12.000.
Slezak, Arnold; and Levy, Lloyd, to Micropolis Corporation. Digital head positioner assembly. 4,875,117, Cl. 360-98.010.
Slovinsky, Manuel: *See*—
Sortwell, Edwin T.; Slovinsky, Manuel; and Mikkelsen, Alan R., 4,874,588, Cl. 422-269.000.
Sluyterman, Albertus A. S., to U.S. Philips Corporation. Picture display system including a deflection unit with a double saddle coil system. 4,874,983, Cl. 313-440.000.
Smagula, Billie T. Belt holder. 4,874,100, Cl. 211-60.100.
Smallwood, Alice R. Combined amusement device and transport and storage pack. 4,874,340, Cl. 446-28.000.
Smart, John R.: *See*—
Taylor, Malcolm R.; Barr, John D.; and Smart, John R., 4,873,895, Cl. 76-108.00A.
Smelcer, John R.: *See*—
Ellison, Larry J.; and Smelcer, John R., 4,873,779, Cl. 42-101.000.
Smeltzer, Paul: *See*—
Ory, Raymond J.; and Smeltzer, Paul, 4,874,147, Cl. 248-210.000.
Smiley, David L.: *See*—
Krumkalns, Eriks V.; and Smiley, David L., 4,874,775, Cl. 514-357.000.
Smith, Carolyn M., to British Telecommunications, plc. Processing apparatus for generating flow charts. 4,875,187, Cl. 364-900.000.
Smith, David: *See*—
Bennett, Brian S.; and Smith, David, 4,873,933, Cl. 441-36.000.
Smith, Edward J.: *See*—
Nowak, Thomas E.; Smith, Edward J.; and Vassiliou, Eustathios, 4,874,277, Cl. 411-61.000.
Smith Engineering: *See*—
Baer, Ralph H.; Curran, Kenneth J.; and Smith, Jay, III, 4,875,096, Cl. 358-143.000.
Smith, Gillan C.: *See*—
Carroll, Paul E.; James, Roy W., III; Bowen, Charles K.; and Smith, Gillan C., 4,875,166, Cl. 364-421.000.
Smith, Jay, III: *See*—
Baer, Ralph H.; Curran, Kenneth J.; and Smith, Jay, III, 4,875,096, Cl. 358-143.000.
Smith, Kim R.; Borland, James E.; and Sauer, Joe D., to Ethyl Corporation. Quaternary ammonium compounds. 4,874,784, Cl. 514-517.000.
Smith, Kim R.; Borland, James E.; and Sauer, Joe D., to Ethyl Corporation. Quaternary ammonium compounds. 4,874,785, Cl. 514-526.000.
Smith, Kim R.; Borland, James E.; and Sauer, Joe D., to Ethyl Corporation. Quaternary ammonium compounds. 4,874,788, Cl. 514-534.000.
Smith, Kim R.; Borland, James E.; and Sauer, Joe D., to Ethyl Corporation. Quaternary ammonium compounds. 4,874,789, Cl. 514-551.000.
Smith, Leroy H., Jr.; and Wilcox, Donald E., to United States of America, Air Force. Variable stator vane assembly for a rotary turbine engine. 4,874,289, Cl. 415-150.000.
Smith, Michael J.: *See*—
Cochrane, Faith E.; Smith, Michael J.; and Litvay, John D., 4,874,465, Cl. 162-111.000.
Smith, Reginald W.: *See*—
Bednarz, George A.; Smith, Reginald W.; Roeding, Gretchen W.; and Test, Howard R., 4,874,722, Cl. 437-209.000.
Smith, Robert P.: *See*—
Johnson, Robert B.; and Smith, Robert P., 4,874,354, Cl. 493-101.000.
Smith, Roger M. Hydromechanical all wheel drive. 4,874,057, Cl. 180-242.000.
Smith, Rosemary L.; and Collins, Scott D., to Massachusetts Institute of Technology. Electrochemical microsensors and method of making such sensors. 4,874,499, Cl. 204-403.000.
Smith, Wayne: *See*—
Trumbull, Douglas; Collins, David; Smith, Wayne; and Spieldiener, Robert, 4,874,162, Cl. 272-18.000.
Smithkline Beckman Corporation: *See*—
Gleason, John G.; Hall, Ralph F.; Ku, Thomas W.; and Perchonock, Carl D., 4,874,792, Cl. 514-570.000.
Smolik, Jiri : *See*—
Vitovec, Jaroslav; Cermak, Jan; and Smolik, Jiri , 4,874,409, Cl. 55-267.000.
Smutny, Edgar J.: *See*—
George, Eric R.; Lutz, Robert G.; and Smutny, Edgar J., 4,874,819, Cl. 525-185.000.
Snamprogetti S.p.A.: *See*—
Rescalli, Carlo; Ricci, Riziero; Scazzosi, Adriano; and Cianci, Flavio, 4,874,474, Cl. 203-18.000.
Snauwaert, Paul E. M.; Vergote, Geert R. J.; and Witdoek, Daniel C., to Ford New Holland, Inc. Air filtering mechanism. 4,874,411, Cl. 55-290.000.
Sobel, Jarl, to Asea Brown Boveri AB. Magnetoelastic torque transducer. 4,873,874, Cl. 73-862.360.
Societe Anonyme dite: Compagnie Generale D'Automatisme CGA-HBS: *See*—
Bergerioux, Jean-Marcel; Pavie, Claude; and Plent, Christian, 4,874,281, Cl. 414-285.000.
Societe Chimique des Charbonnages: *See*—
Teissier, Remy; and Clamens, Serge, 4,874,859, Cl. 544-221.000.
Societe Compagnie Generale Textile Cogetex: *See*—
Egea, Noel; and Olive, Corinne, 4,874,241, Cl. 356-238.000.
Societe Nationale Elf Aquitaine: *See*—
Payre, Didier; Crozat, Georges; and Spinner, Bernard, 4,873,842, Cl. 62-480.000.
Societe Nouvelle D'Exploitation La Calhene: *See*—
Teillauchet, Eric; and Bandiera, Angelo, 4,873,885, Cl. 74-520.000.
Soda, Yutaka: *See*—
Leonard, Vurnen; Kato, Arthur K.; Ohmori, Kiyoshi; Fujiwara, Keisuke; and Soda, Yutaka, 4,875,128, Cl. 360-133.000.
Sodeyama, Fumio: *See*—
Yamamoto, Shosaku; Kakinuma, Kazuo; Ishioka, Hiroshi; Sodeyama, Fumio; Mayumi, Junji; and Maruta, Riichiro, 4,874,818, Cl. 525-183.000.
Soga, Akihiro: *See*—
Izumitani, Masayoshi; and Soga, Akihiro, 4,873,811, Cl. 53-138.00A.
Sola USA, Inc.: *See*—
Spector, David P., 4,874,561, Cl. 264-1.100.
Solar Turbines Incorporated: *See*—
Cang, John N.; Gast, Joseph R.; Hensley, John J.; and Waldhelm, Christian M., 4,874,290, Cl. 415-173.400.
Sole, Pedro, to United Brands Company. Banana processing. 4,874,617, Cl. 426-49.000.
Solvay & Cie, S.A.: *See*—
Andrews, William H.; Brothers, Virginia M.; Files, James G.; Kuhn, Irene; McCaman, Michael T.; Paul, Leland S.; Sias, Stacey R.; Gore, Thomas C.; Newman, Karel Z., Jr.; and Tedesco, John L., 4,874,705, Cl. 435-252.330.
Soma, Takao: *See*—
Oda, Isao; and Soma, Takao, 4,874,674, Cl. 428-469.000.
Somar Corporation: *See*—
Orikasa, Teruo; Sumi, Sigeo; and Taguchi, Hiroshi, 4,874,282, Cl. 414-416.000.
Somatics, Inc.: *See*—
Abrams, Richard; and Swartz, Conrad M., 4,873,981, Cl. 128-419.00S.
Somerset Technologies, Inc.: *See*—
McGill, Paul E.; and Pitigliano, Frank J., 4,874,305, Cl. 425-131.100.
Someya, Akihiko: *See*—
Yamanishi, Eiichi; Abuyama, Yasuo; and Someya, Akihiko, 4,875,092, Cl. 358-75.000.
Sommerfeld, Claus-Dieter: *See*—
Haas, Peter; Sommerfeld, Claus-Dieter; and Weber, Hans-Ulrich, 4,874,797, Cl. 521-167.000.
Sonetaka, Noriyoshi, to NEC Corporation. Pseudo-noise sequence generator. 4,875,021, Cl. 331-78.000.
Sonoda, Sakae; Hetsugi, Kouji; Sawasaki, Yoshihiko; Kaburagi, Kouji; and Matsushima, Yasunobu, to Henkel Corporation. Process for treatment of titanium and titanium alloys. 4,874,480, Cl. 204-56.100.
Sony Corporation: *See*—
Kamon, Yoshiyuki; Ogiwara, Akira; and Nageno, Koji, 4,874,316, Cl. 439-39.000.
Kondo, Tetsuya, 4,874,964, Cl. 307-270.000.
Leonard, Vurnen; Kato, Arthur K.; Ohmori, Kiyoshi; Fujiwara, Keisuke; and Soda, Yutaka, 4,875,128, Cl. 360-133.000.
Odaka, Kentaro; Fukami, Tadashi; and Ozaki, Shinya, 4,875,111, Cl. 360-64.000.
Ohta, Yoshiyuki; and Kihara, Taku, 4,875,044, Cl. 341-87.000.
Takahashi, Kiyoshi; and Noda, Masayuki, 4,875,120, Cl. 360-106.000.
Tanaka, Masato; and Kan, Toshiya, 4,874,993, Cl. 318-254.000.
Yamamoto, Isamu; and Asaida, Takashi, 4,875,098, Cl. 358-213.160.
Yonemoto, Kazuya; Kagawa, Yoshiaki; Ishikawa, Kikue; Suzuki, Tomoyuki; and Hamasaki, Masaharu, 4,875,100, Cl. 358-213.190.
Sootome, Sumitoshi; Mizutani, Morikazu; Ikemoto, Isao; Kanemitsu, Shinji; Kitajima, Hajime; and Onoda, Shigeyoshi, to Canon Kabushiki Kaisha. Image reading device and image forming apparatus having same. 4,875,075, Cl. 355-50.000.
Sorensen, James L.; Yarbro, Mark D.; and Glockner, Charles A., to Magma Copper Company. Method for removal of organic solvents from aqueous process streams. 4,874,534, Cl. 210-803.000.
Sorenson, Roderick J.: *See*—
Carethers, Mary E.; Centenko, Wiaczeslaw A.; Connor, David T.; Johnson, Elizabeth A.; Kiely, John S.; Schwender, Charles F.; Sircar, Jagadish C.; Sorenson, Roderick J.; Unangst, Paul C.; and Bruns, Robert F., 4,874,758, Cl. 514-226.500.
Sorrento Engineer, Inc.: *See*—
Hill, Francis V.; and Crosswhite, Lola E., 4,874,648, Cl. 428-35.900.
Sortwell, Edwin T.; Slovinsky, Manuel; and Mikkelsen, Alan R., to Diatec Polymers. Method and apparatus for rapidly dissolving polymers in water. 4,874,588, Cl. 422-269.000.
Soukup, Thomas M.: *See*—
McArthur, William; and Soukup, Thomas M., 4,874,372, Cl. 604-110.000.
Southard, Robert C. Press fit gun cradle for firearm maintenance and repair. 4,873,777, Cl. 42-94.000.
Southwest Research Institute: *See*—
Ryan, Thomas W., III; Maymar, Milan J.; and Anderson, Orin M., 4,873,947, Cl. 123-78.00C.
Southwire Company: *See*—
Watkins, Clinton E.; and Rowland, Bobby A., 4,874,442, Cl. 156-48.000.
Spaderna, Dieter W.; and Miller, Jeffrey L., to Sharp Microelectronic Technology, Inc. Method of operating data buffer apparatus. 4,875,196, Cl. 365-238.000.
Spang, S. Timothy: *See*—
Featherstone, John L.; Spang, S. Timothy; Newell, David G.; and Gallup, Darrell L., 4,874,529, Cl. 210-713.000.

Spear Jr., A. Gil: *See—*
Palett, Anthony P.; and Spear Jr., A. Gil, 4,875,229, Cl. 379-58.000.
Spector, David P., to Sola USA, Inc. Method for designing parametric molding apparatus. 4,874,561, Cl. 264-1.100.
Spector, Donald. Bicycle safety lights. 4,875,142, Cl. 362-72.000.
Spectra-Physics, Inc.: *See—*
Volten, Curt V., 4,873,843, Cl. 62-51.100.
SpecTran Corporation: *See—*
Vacha, Lubos J. B.; Schultz, Peter C.; Moynihan, Cornelius T.; Raychaudhuri, Satyabrata; Cadien, Ken C.; Harbison, Barry B.; and Mossadegh, Reza, 4,874,222, Cl. 350-96.340.
Spencer, Arthur T., to Flexicon Systems Limited. Mounting arrangement for a chip carrier. 4,874,318, Cl. 439-71.000.
Spencer, Robert B., to Nicolet Instrument Corporation. Mass spectrometer ion excitation system. 4,874,943, Cl. 250-281.000.
Spencer Turbine Company, The: *See—*
Poor, James C., 4,874,410, Cl. 55-276.000.
Spieldiener, Robert: *See—*
Trumbull, Douglas; Collins, David; Smith, Wayne; and Spieldiener, Robert, 4,874,162, Cl. 272-18.000.
Spiess, Hansruedi; and Galvanetto, Francois, to Von Roll, AG. Covering for a ground opening. 4,873,795, Cl. 52-20.000.
Spillman Jr., William B., to Simmonds Precision Products, Inc. Optical displacement sensor with a multi-period grating. 4,874,941, Cl. 250-237.00G.
Spillman, William B., Jr.; Rudd, Robert E., III; Ellinger, Sylvester M.; Patriquin, Douglas R.; and Kline, Bruce R., to Simmonds Precision Products, Inc. Optical shaft angular and torsional displacement and speed sensing system. 4,874,245, Cl. 356-364.000.
Spindt, Charles A., to SRI International. Automatically focusing field emission electrode. 4,874,981, Cl. 313-309.000.
Spinner, Bernard: *See—*
Payre, Didier; Crozat, Georges; and Spinner, Bernard, 4,873,842, Cl. 62-480.000.
Spinner, Georg. Waveguide twist. 4,875,027, Cl. 333-254.000.
Spirkovitch, Serge: *See—*
Pierre, Andre; Batilteu, Francois; Brosselard, Jean-Pierre; Permuy, Alfred; Pirot, Francois-Xavier; and Spirkovitch, Serge, 4,873,868, Cl. 73-517.00R.
Spitzer, Charles M.; and Siegel, Paul F., to A-Bee Syndicate, Inc. Rolling drawer. 4,874,209, Cl. 312-250.000.
Square D Company: *See—*
Cybela, Jeffrey J., 4,874,960, Cl. 307-64.000.
Sramek, John A., to S. C. Johnson & Son, Inc. Hairspray with improved adhesion/removability upon washing. 4,874,604, Cl. 424-47.000.
SRI International: *See—*
Madou, Marc J.; and Otagawa, Takaaki, 4,874,500, Cl. 204-412.000.
Spindt, Charles A., 4,874,981, Cl. 313-309.000.
SSMC Inc.: *See—*
Adams, Kenneth D., 4,873,932, Cl. 112-443.000.
STA-SET Corporation: *See—*
O'Boyle, Matthew, 4,874,386, Cl. 604-246.000.
Stackpole Corporation, The: *See—*
Engle, George M., 4,873,942, Cl. 118-728.000.
Stahli, Jurg: *See—*
Muller, Gunter; Nagel, Rolf; and Stahli, Jurg, 4,874,812, Cl. 524-712.000.
Stalberg, Ralph I., to Pharmacia AB. Method of supplying buffer solutions to electrophoretic separation procedures. 4,874,491, Cl. 204-182.800.
Standard Oil Company, The: *See—*
Brazdil, James F., Jr.; Glaeser, Linda C.; and Toft, Mark A., 4,874,738, Cl. 502-209.000.
Staniulis, Mark T.; and Risch, Alan P., to UOP. Catalytic reduction of nitrogen oxides. 4,874,590, Cl. 423-239.000.
Stanko, Ronald T., to Montefiore Hospital Association of Western Pennsylvania. Method for improving the glucose metabolism of an animal having diabetic tendencies. 4,874,790, Cl. 514-557.000.
Stauffer Chemical Company: *See—*
Roberts, Auston K.; Trainer, William E.; and Biederman, David L., 4,874,593, Cl. 423-322.000.
Staunton, Harold F.: *See—*
Hallam, Donald E.; Popper, Peter; Staunton, Harold F.; Taylor, Robert E.; and Yngve, Paul W., 4,873,821, Cl. 57-293.000.
STC PLC: *See—*
Janssen, Adrian P., 4,874,217, Cl. 350-96.200.
Steece, William H.: *See—*
Elliott, William A.; Greene, Richard A.; Kennedy, Robert P.; Poe, Robert P., Jr.; and Steece, William H., 4,873,762, Cl. 29-809.000.
Steel, Francis R.: *See—*
Siwiak, Kazimierz; Jasinski, Leon; and Steel, Francis R., 4,875,038, Cl. 340-825.440.
Steele, David F., to United Kingdom Atomic Energy Authority. Method for the treatment of waste matter. 4,874,485, Cl. 204-130.000.
Steele, Sarah L.: *See—*
Frederick, Warren P.; Steele, Sarah L.; Rhodes, David D.; and Arns, Christopher L., 4,874,365, Cl. 604-54.000.
Steffen, Daniel G.: *See—*
Boyle, Peter C.; Steffen, Daniel G.; Melton, John L.; Coccodrilli, Gus D., Jr.; and Nagy, Michael A., 4,874,606, Cl. 426-74.000.
Steger, Horst: *See—*
Haase, Peter; Kosikowski, Thomas; and Steger, Horst, 4,874,479, Cl. 204-27.000.
Stegmann, Werner; Meier, Hans R.; Evans, Samuel; Martin, Roger; and Luisoli, Reto, to Ciba-Geigy Corporation. Process for the preparation of mercaptomethylphenols. 4,874,885, Cl. 560-15.000.
Stegmueller, Bernhard: *See—*
Kappeler, Franz; Wolf, Thomas; and Stegmueller, Bernhard, 4,875,217, Cl. 372-50.000.
Steimel, Lyle H.; and Christensen, Ronald J., to DuBois Chemicals, Inc. All-in-one boiler water treatment composition. 4,874,541, Cl. 252-178.000.
Steinberg, Joseph; and McCabe, Raphaela. Executive balls. 4,874,165, Cl. 273-1.0GC.
Steiner, Paul A.: *See—*
Browne, James M.; and Steiner, Paul A., 4,874,661, Cl. 428-246.000.
Steinert, Rosa M. Cigarette holder. 4,873,999, Cl. 131-259.000.
Stelmack, Gerard G.: *See—*
Guscott, John K.; Stelmack, Gerard G.; and Boulos, Charles A., 4,875,029, Cl. 340-567.000.
Sterling Drug Inc.: *See—*
D'Ambra, Thomas E.; and Bell, Malcolm R., 4,874,761, Cl. 514-235.200.
Sterling, Rosstain F.: *See—*
Strickland, Wilbur C., Jr.; and Sterling, Rosstain F., 4,874,536, Cl. 252-90.000.
Stierman, Roger J.; McCauley, Archie N.; and Zart, Robert C., to Texas Instruments Incorporated. Fixture for plating tall contact bumps on integrated circuit. 4,874,476, Cl. 204-15.000.
Stipanovic, Arthur J.: *See—*
Robison, Peter D.; and Stipanovic, Arthur J., 4,874,044, Cl. 166-275.000.
Stipp, M. R. Gun bore cleaning apparatus. 4,873,778, Cl. 42-95.000.
Stoehr, Herbert M., to Artos Engineering Company. Apparatus for cutting and stripping insulation from wire segments having different gauge conductors. 4,873,901, Cl. 81-9.510.
Stoltz, Richard A.: *See—*
McLaughlin, David F.; and Stoltz, Richard A., 4,874,475, Cl. 203-51.000.
Stoppazzini, Benito, to E.M.M. Emiliana Macchine Maglieria S.r.l. Device for supporting the thread guide of an automatic flat knitting machine. 4,873,845, Cl. 66-126.00R.
Stott, Herbert L.: *See—*
Strasser, Thomas F.; and Stott, Herbert L., 4,874,050, Cl. 177-134.000.
Strang, Harry: *See—*
Jelich, Klaus; Gayer, Herbert; Kramer, Wolfgang; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,874,424, Cl. 71-105.000.
Wroblowsky, Heinz-Jurgen; Kluth, Joachim; Tietjen, Klaus-Gunther; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,874,420, Cl. 71-93.000.
Strasser, Thomas F.; and Stott, Herbert L., to Fairbanks Inc. Portable deck truck scale. 4,874,050, Cl. 177-134.000.
Strausser, Richard A., to Hope Sexton. Color coding device, kit of components thereof, and methods of constructing and utilizing same. 4,874,084, Cl. 206-231.000.
Strein, Klaus: *See—*
Mertens, Alfred; von der Saal, Wolfgang; Berger, Herbert; Muller-Beckmann, Bernd; and Strein, Klaus, 4,874,756, Cl. 514-212.000.
Strickland, Wilbur C., Jr.; and Sterling, Rosstain F., to Proctor & Gamble Company, The. Synthetic surfactant cakes with magnesium chloride. 4,874,536, Cl. 252-90.000.
Suchocki, Anthony J., to General Dynamics Land Systems, Inc. Double loop ammunition magazine of compact construction. 4,873,911, Cl. 89-34.000.
Suck, Yoon-Gi. Manufacturing method of the gas-flow valve nozzle of a lighter. 4,873,752, Cl. 29-157.00C.
Suda, Shigeyuki, to Canon Kabushiki Kaisha. Zoom lens with a variable power lens element. 4,874,230, Cl. 350-423.000.
Sudani, Kiyoshi; and Sunami, Yoshihiko, to Sumitomo Metal Industries, Ltd. Molding process and device therefor. 4,874,564, Cl. 264-24.700.
Suemitsu, Yuji: *See—*
Masuda, Koji; Suemitsu, Yuji; and Asano, Kazuo, 4,875,060, Cl. 346-155.000.
Sueoka, Akinori: *See—*
Okamoto, Takehiko; Ohmory, Akio; Sueoka, Akinori; Kawata, Ichiro; and Akasu, Hiroyuki, 4,874,522, Cl. 210-645.000.
Sueyoshi, Toshinobu: *See—*
Asada, Seiichi; Sueyoshi, Toshinobu; and Miyake, Akira, 4,874,668, Cl. 428-403.000.
Sufi, Arshad H.: *See—*
Joseph, Earl M.; Pritchard, Robert J.; and Sufi, Arshad H., 4,874,043, Cl. 166-272.000.
Sugawara, Satoshi: *See—*
Igarashi, Takao; Sugawara, Satoshi; Yoshimoto, Yuichiro; Saito, Shozo; Fukumoto, Takashi; Endo, Zenichiro; and Shinbo, Katsutoshi, 4,874,574, Cl. 376-333.000.
Sugihara, Masahiro: *See—*
Kobayashi, Norihide; Inaba, Tsutomu; Kimura, Tadashi; and Sugihara, Masahiro, 4,874,302, Cl. 418-55.000.
Sugimori, Teruhiko; Suzuki, Fumio; Habara, Hideaki; and Inada, Hiromasa, to Mitsubishi Rayon Co., Ltd. Particulate polymer and preparation process thereof. 4,874,841, Cl. 528-491.000.
Sugimoto, Masahiro: *See—*
Miyauchi, Akira; Nishimoto, Hiroshi; Okiyama, Tadashi; Kitasagami, Hiroo; Sugimoto, Masahiro; Tamada, Haruo; and Emori, Shinji, 4,875,087, Cl. 357-71.000.
Sugimoto, Shunjiro: *See—*
Sugimura, Keijiro; Sugimoto, Shunjiro; and Shirasawa, Hounai, 4,874,697, Cl. 435-68.000.

Sugimura, Keijiro; Sugimoto, Shunjiro; and Shirasawa, Hounai, to Suntory Limited. Novel Host *e. coli* and use thereof. 4,874,697, Cl. 435-68.000.

Sugimura, Tuyoshi; Hori, Kenji; and Oba, Kiyoyuki, to Iseki Food Engineering Kabushiki Kaisha; and Kabushiki Kaisha Horiken. Apparatus for continuously cooking rice by steaming. 4,873,917, Cl. 99-355.000.

Sugisawa, Ko; Matsumura, Yasushi; Okamoto, Hidefumi; and Hayami, Hiroshi, to House Food Industrial Company Limited. Pressure-controlling method. 4,874,580, Cl. 422-25.000.

Sugiura, Noboru: *See*—
Kimura, Hiroshi; Naito, Shotaro; Miyashita, Kunio; Noto, Yasuo; Sugiura, Noboru; Takahashi, Tadashi; Yamamura, Hirohisa; Yamashita, Seizi; Kawamata, Syooichi; Tajima, Fumio; and Horikoshi, Shigeru, 4,874,053, Cl. 180-79.100.

Sumi, Sigeo: *See*—
Orikasa, Teruo; Sumi, Sigeo; and Taguchi, Hiroshi, 4,874,282, Cl. 414-416.000.

Sumito, Mitsuo: *See*—
Hamada, Takao; Tsuchiya, Nobuo; Inatani, Toshihiro; Katayama, Eiji; Koitabashi, Toshimitsu; Okabe, Kyoji; Sumito, Mitsuo; and Takada, Yoshiyasu, 4,874,427, Cl. 75-26.000.

Sumitomo Chemical Company, Limited: *See*—
Yamamoto, Shinobu; Okada, Kunihiro; Ohi, Satoshi; Oyama, Shiro; and Takei, Yasuharu, 4,874,787, Cl. 514-531.125.

Sumitomo Electric Industries, Ltd.: *See*—
Fujioka, Hideaki; and Takata, Koji, 4,875,171, Cl. 364-508.000.

Sumitomo Metal Industries, Ltd.: *See*—
Sudani, Kiyoshi; and Sunami, Yoshihiko, 4,874,564, Cl. 264-24.700.

Sun, Rickson: *See*—
Groswith III, Charles T.; Seipp III, Edwin A.; Sun, Rickson; and Yurchenco, James R., 4,874,186, Cl. 281-28.000.

Sunami, Yoshihiko: *See*—
Sudani, Kiyoshi; and Sunami, Yoshihiko, 4,874,564, Cl. 264-24.700.

Sundholm, Goran. Apparatus for flushing a piping system. 4,874,002, Cl. 134-111.000.

Sundstrand Corporation: *See*—
Bansal, Madan L.; and Byrd, William A., 4,874,972, Cl. 310-57.000.
Henderson, Eric A., 4,874,961, Cl. 307-87.000.
Reynolds, David W., 4,874,190, Cl. 285-158.000.
Roe, Derrick I.; Rozman, Christopher J.; and Recker, Bradley J., 4,875,148, Cl. 363-41.000.
Rozman, Christopher J.; Roe, Derrick I.; and Recker, Bradley J., 4,875,149, Cl. 363-41.000.

Suntory Limited: *See*—
Sugimura, Keijiro; Sugimoto, Shunjiro; and Shirasawa, Hounai, 4,874,697, Cl. 435-68.000.

Sutherland, Jeffrey L. Knee orthosis. 4,873,967, Cl. 128-80.00C.

Sutherland, Karl M.; and Jenusaitis, Matthew, to Baxter International Inc. O_2/CO_2 control in blood oxygenators. 4,874,581, Cl. 422-46.000.

Suwabe, Hirohisa: *See*—
Hatanaka, Koji; Maruta, Kenzi; and Suwabe, Hirohisa, 4,874,923, Cl. 219-270.000.

Suzuki, Akiyoshi: *See*—
Torigoe, Makoto; and Suzuki, Akiyoshi, 4,875,076, Cl. 355-53.000.

Suzuki, Etsuo: *See*—
Ochiai, Hironori; Suzuki, Etsuo; and Ikuta, Kazuo, 4,874,202, Cl. 296-222.000.

Suzuki, Fumio: *See*—
Sugimori, Teruhiko; Suzuki, Fumio; Habara, Hideaki; and Inada, Hiromasa, 4,874,841, Cl. 528-491.000.

Suzuki, George: *See*—
Yamada, Ichiji; Inuzuka, Yutake; Ichihara, Isao; Murakami, Michiyuki; Suzuki, George; Yanahashi, Ryou; and Kondo, Takeshi, 4,873,884, Cl. 74-473.00P.

Suzuki, Kunikazu: *See*—
Sakai, Shunji; Kitagawa, Tohru; Suzuki, Kunikazu; and Watanabe, Naohiro, 4,875,099, Cl. 358-213.110.

Suzuki, Makoto: *See*—
Sangyoji, Kazuo; Sakai, Jun; Hayashi, Shigeyuki; Suzuki, Makoto; and Kimura, Yasuo, 4,875,074, Cl. 355-27.000.

Suzuki, Tadasu, to Tsubakimoto Chain Co. Fluidic tensioner. 4,874,352, Cl. 474-110.000.

Suzuki, Takami; Tatara, Yoshikuni; and Moriya, Tomoyuki, to Ricoh Company, Ltd. Selective magnetic attachment of a print head to a drive belt. 4,874,264, Cl. 400-335.000.

Suzuki, Takami: *See*—
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.

Suzuki, Tetsuro; Yoshikawa, Masao; and Kojima, Akio, to Ricoh Company, Ltd. N,N'-diphenylbenzidine polymer and method of producing the same. 4,874,481, Cl. 204-59.00R.

Suzuki, Tomoyuki: *See*—
Yonemoto, Kazuya; Kagawa, Yoshiaki; Ishikawa, Kikue; Suzuki, Tomoyuki; and Hamasaki, Masaharu, 4,875,100, Cl. 358-213.190.

Suzuki, Toshio; and Okawa, Tadashi, to Toray Silicone Company, Ltd. Method for producing a polydiorganosiloxane having a pendent alkenyl radical at its molecular center. 4,874,881, Cl. 556-453.000.

Svenska Traforskningsinstitutet: *See*—
Karlsson, Hakan I.; Lundqvist, Inge J.; Hardin, Bengt Y.; and Ostman, Thomas L., 4,874,467, Cl. 162-198.000.

Swartz, Conrad M.: *See*—
Abrams, Richard; and Swartz, Conrad M., 4,873,981, Cl. 128-419.00S.

Swartz, Ronald W.: *See*—
Mulder, Theodor; and Swartz, Ronald W., 4,875,191, Cl. 365-189.010.

SwedSteam AB: *See*—
Gilliusson, Rolf, 4,873,840, Cl. 62-238.600.

Swieringa, Morris K., to McNeil-PC, Inc. Web corrugating apparatus. 4,874,457, Cl. 156-474.000.

Swinderman, Robert T., to Martin Engineering Company. Conveyor skirt board, clamp and mounting arrangement. 4,874,082, Cl. 198-836.000.

Swiss Aluminium Ltd.: *See*—
Homberger, Heinrich; Timm, Jurgen; and Rodriques, Pedro, 4,874,578, Cl. 420-541.000.

Switchcraft, Inc.: *See*—
Lau, Frederick L., 4,874,317, Cl. 439-54.000.

Synovec, Robert E.; and Yueng, Edward S., to Iowa State University Research Foundation, Inc. Method for improving the limit of detection in a data signal. 4,875,169, Cl. 364-497.000.

Syntex (U.S.A.) Inc.: *See*—
Fleming, Michael P.; Schloemer, George C.; and Khatri, Hiralal N., 4,874,871, Cl. 548-543.000.
Fleming, Michael P.; Khatri, Hiralal N.; and Schloemer, George C., 4,874,872, Cl. 548-531.000.

Synthetic Blood Corporation: *See*—
Ecanow, Charles S.; and Ecanow, Bernard, 4,874,742, Cl. 514-2.000.

Szporny, Laszlo : *See*—
Lapis, Erzsebet; Toth, Edit; Kiss, Bela; Torley, Jozsef; Palosi, Eva; Hajdu, Istvan; Szporny, Laszlo ; Groo, Dora; and Laszlovszky, Istvan, 4,874,765, Cl. 514-255.000.

Szymanski, Thomas; and Turner, Stephen M., to Norton Company. Raghouse bag design for simultaneous particulate capture and chemical reaction. 4,874,586, Cl. 422-177.000.

Tabata, Kaoru: *See*—
Sato, Masahiko; Konuma, Toshimitsu; Odaka, Seiichi; Yamaguchi, Toshiharu; Watanabe, Toshio; Aoyagi, Osamu; Tabata, Kaoru; Isigaki, Chizuru; Sakayori, Hiroyuki; Kobayashi, Ippei; Osabe, Akio; and Yamazaki, Shunpei, 4,874,461, Cl. 156-633.000.

Tachi-S Co., Ltd.: *See*—
Urai, Muneharu, 4,874,448, Cl. 156-196.000.

Tachibana, Hiroyuki: *See*—
Nishimoto, Yoshiro; Yoneda, Yasuji; Imaoka, Shinichi; Nakai, Yasuhide; Nakaue, Akimitsu; Onishi, Yoshihiko; Tachibana, Hiroyuki; Inoue, Takayoshi; Kusaka, Takuya; Takamatsu, Hiroyuki; Tojyo, Shigeki; Kajikawa, Hiroshi; and Nishimura, Kozo, 4,874,939, Cl. 250-211.00J.

Tachibana, Sadao: *See*—
Aoki, Kazuo; and Tachibana, Sadao, 4,874,913, Cl. 200-314.000.

Tachiiri, Yoshikazu: *See*—
Kojima, Fumio; Tachiiri, Yoshikazu; and Kato, Yoshihisa, 4,874,174, Cl. 285-82.000.

Tack, Robert D.; Andrews, Rodger F.; and Ayres, Sally J., to Exxon Chemical Patents Inc. Crude oil and fuel oil compositions. 4,874,394, Cl. 44-70.000.

Tada, Yoshihiko: *See*—
Nishii, Michiharu; Ando, Masamoto; and Tada, Yoshihiko, 4,874,207, Cl. 303-52.000.

Taga, Yasunori: *See*—
Hamaguchi, Shigeki; Ohtsuka, Yasuhiro; Motohiro, Tomoyoshi; Taga, Yasunori; and Ishii, Masahiko, 4,874,664, Cl. 428-325.000.

Tagawa, Kenichi, to Nippon Seiko Kabushiki Kaisha. Clutch release bearing device. 4,874,073, Cl. 192-98.000.

Taguchi, Hiroshi: *See*—
Orikasa, Teruo; Sumi, Sigeo; and Taguchi, Hiroshi, 4,874,282, Cl. 414-416.000.

Tahara, Kazutoki; and Egawa, Toshihiko, to Shin-Etsu Polymer Co., Ltd. Heat-resistant anti-glare screen. 4,874,671, Cl. 428-447.000.

Tahara, Tetsuya; Ikebe, Tsuguo; Hakamada, Ichiro; and Yaoka, Osamu, to Yoshitomi Pharmaceutical Industries, Ltd. 5-Hydroxyindole-3-carboxylic acid amide compounds, pharmaceutical compositions and use. 4,874,759, Cl. 514-232.300.

Tajima, Fumio: *See*—
Kimura, Hiroshi; Naito, Shotaro; Miyashita, Kunio; Noto, Yasuo; Sugiura, Noboru; Takahashi, Tadashi; Yamamura, Hirohisa; Yamashita, Seizi; Kawamata, Syooichi; Tajima, Fumio; and Horikoshi, Shigeru, 4,874,053, Cl. 180-79.100.

Takabayashi, Naoki: *See*—
Kobayashi, Kazuhiro; Kuramatsu, Masayuki; Koboshi, Shigeharu; Goto, Nobutaka; and Takabayashi, Naoki, 4,874,530, Cl. 210-718.000.

Takada, Hiromi: *See*—
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.

Takada, Yoshiyasu: *See*—
Hamada, Takao; Tsuchiya, Nobuo; Inatani, Toshihiro; Katayama, Eiji; Koitabashi, Toshimitsu; Okabe, Kyoji; Sumito, Mitsuo; and Takada, Yoshiyasu, 4,874,427, Cl. 75-26.000.

Takada, Yusaku; and Takeda, Kenji, to Canon Kabushiki Kaisha. Anti-fouling device for sheet gripper. 4,875,069, Cl. 355-271.000.

Takagaki, Hidetsugu; Abe, Masayoshi; Watanabe, Michihiro; Takeuchi, Kazuyuki; Nakanishi, Shigenori; Nakata, Yuuko; and Yamazaki, Keiji, to Dainippon Ink and Chemicals, Inc. Steroid compounds and process of preparing the same. 4,874,855, Cl. 540-3.000.

Takagi, Katsumasa, to Koyo Disposable Goods Company. Vacuum drum apparatus for providing sanitary articles. 4,874,456, Cl. 156-471.000.

Takagi, Katsumi; Negoro, Toshihito; and Tamagawa, Itaru, to Pegasus Sewing Machine Mfg. Co., Ltd. Programmed thread regulating apparatus for a sewing machine. 4,873,931, Cl. 112-121.110.

Takahashi, Hiroshi: *See*—
Urabe, Yoshihiko; Higashi, Tatsuji; Takahashi, Hiroshi; and Kita, Nobuyuki, 4,874,686, Cl. 430-272.000.

Takahashi, Kazuo; and Kubo, Hiroyoshi, to Canon Kabushiki Kaisha. Projection exposure apparatus. 4,874,954, Cl. 250-548.000.

Takahashi, Kazuo: *See*—
Kuwabara, Takao; and Takahashi, Kazuo, 4,874,999, Cl. 318-610.000.

Takahashi, Kiyoshi; and Noda, Masayuki, to Sony Corporation. Head driving apparatus with coarse and fine adjustments. 4,875,120, Cl. 360-106.000.

Takahashi, Koji: *See*—
Shimokoriyama, Makoto; Yamashita, Shinichi; Abe, Naoto; Kashida, Motokazu; Takei, Masahiro; and Takahashi, Koji, 4,875,090, Cl. 358-12.000.

Takahashi, Shigeyuki: *See*—
Ito, Toshiyasu; Minoura, Jun; Mori, Takaaki; Takahashi, Shigeyuki; Kato, Mamoru; Shimada, Junichi; and Hayakawa, Fujio, 4,874,229, Cl. 350-357.000.

Takahashi, Tadashi: *See*—
Kimura, Hiroshi; Naito, Shotaro; Miyashita, Kunio; Noto, Yasuo; Sugiura, Noboru; Takahashi, Tadashi; Yamamura, Hirohisa; Yamashita, Seizi; Kawamata, Syooichi; Tajima, Fumio; and Horikoshi, Shigeru, 4,874,053, Cl. 180-79.100.

Takahashi, Yoshinobu: *See*—
Fukuta, Kenji; Kaneko, Takaoki; and Takahashi, Yoshinobu, 4,874,453, Cl. 156-345.000.

Takahasi, Kunimasa: *See*—
Oda, Kyoko; Takahasi, Kunimasa; and Seo, Iwao, 4,874,598, Cl. 423-598.000.

Takahata, Katsumasa: *See*—
Maeno, Mikihiko; Ohta, Yukio; Momiyama, Yoshiharu; Ono, Hisao; Takahata, Katsumasa; Ozono, Kazuyuki; Shimizu, Makoto; and Yamamoto, Mikio, 4,874,159, Cl. 271-171.000.

Takai, Ryoji, to Nissan Motor Co., Ltd. End structure for synthetic resin member. 4,874,651, Cl. 428-81.000.

Takamatsu, Hiroyuki: *See*—
Nishimoto, Yoshiro; Yoneda, Yasuji; Imaoka, Shinichi; Nakai, Yasuhide; Nakaue, Akimitsu; Onishi, Yoshihiko; Tachibana, Hiroyuki; Inoue, Takayoshi; Kusaka, Takuya; Takamatsu, Hiroyuki; Tojyo, Shigeki; Kajikawa, Hiroshi; and Nishimura, Kozo, 4,874,939, Cl. 250-211.00J.

Takamatsu, Junichi; and Akiyama, Kazunori, to Mita Industrial Co., Ltd. Image-forming machine. 4,875,077, Cl. 355-212.000.

Takamura, Yoshinari; Obara, Kazuaki; and Nagashima, Michiyoshi, to Matsushita Electric Industrial Co., Ltd. Tracking servo signal generating device for an optical disc. 4,875,203, Cl. 369-46.000.

Takano, Hideaki: *See*—
Shino, Masami; Takano, Hideaki; Nakata, Jitsuo; and Noro, Katsuhiko, 4,874,592, Cl. 423-262.000.

Takata, Kenichi: *See*—
Koshiba, Nobuharu; Ikehata, Toshihiko; and Takata, Kenichi, 4,874,680, Cl. 429-197.000.

Takata, Koji: *See*—
Fujioka, Hideaki; and Takata, Koji, 4,875,171, Cl. 364-508.000.

Takata, Yasushi: *See*—
Kinomura, Keisuke; Kitazawa, Sadaya; Takata, Yasushi; and Sakakibara, Toshiyuki, 4,874,852, Cl. 536-18.600.

Takaya, Toshihiko: *See*—
Ishikawa, Toyoji; Kaneko, Toshio; Endo, Shuichi; Ogata, Yoshihiro; and Takaya, Toshihiko, 4,873,940, Cl. 118-651.000.

Takeda Chemical Industries, Ltd.: *See*—
Terao, Shinji; Okazaki, Hisayoshi; and Imada, Isuke, 4,874,752, Cl. 536-55.200.

Takeda, Ken'ichi; and Horibe, Isao, to Shionogi and Co., Ltd. Patent Department. Novel substituted anthrasteroid derivatives. 4,874,898, Cl. 568-369.000.

Takeda, Kenji: *See*—
Takada, Yusaku; and Takeda, Kenji, 4,875,069, Cl. 355-271.000.

Takei, Masahiro: *See*—
Shimokoriyama, Makoto; Yamashita, Shinichi; Abe, Naoto; Kashida, Motokazu; Takei, Masahiro; and Takahashi, Koji, 4,875,090, Cl. 358-12.000.

Takei, Yasuharu: *See*—
Yamamoto, Shinobu; Okada, Kunihiro; Ohi, Satoshi; Oyama, Shiro; and Takei, Yasuharu, 4,874,787, Cl. 514-531.125.

Takeuchi, Kazuyuki: *See*—
Takagaki, Hidetsugu; Abe, Masayoshi; Watanabe, Michihiro; Takeuchi, Kazuyuki; Nakanishi, Shigenori; Nakata, Yuuko; and Yamazaki, Keiji, 4,874,855, Cl. 540-3.000.

Takeuchi, Koji: *See*—
Higuchi, Ryoichi; Sakurai, Takao; Yokota, Tadahiko; Mikami, Naoko; Yamamoto, Eri; and Takeuchi, Koji, 4,874,542, Cl. 252-299.610.

Takeuchi, Michikazu: *See*—
Yamamoto, Shinobu; Hoshide, Fumitoshi; Takeuchi, Michikazu; Kotani, Shou; and Yasuda, Sumihiro, 4,874,924, Cl. 219-274.000.

Talalay, Anselm; and Borsvold, Herbert H., to Laudy, Roger; and U.S. Printcraft. Decal transfer device. 4,874,454, Cl. 156-359.000.

Talalay, Paul: *See*—
Payne, Donna W.; and Talalay, Paul, 4,874,696, Cl. 435-26.000.

Talbert, James E., Jr., to Morrison Textile Machinery Company. Textile steaming apparatus. 4,873,846, Cl. 68-5.00E.

Taliercio, Michele: *See*—
Daniele, Vincenzo; Monti, Marco M.; Taliercio, Michele; and Capocelli, Piero, 4,875,020, Cl. 330-307.000.

Tamada, Haruo: *See*—
Miyauchi, Akira; Nishimoto, Hiroshi; Okiyama, Tadashi; Kitasagami, Hiroo; Sugimoto, Masahiro; Tamada, Haruo; and Emori, Shinji, 4,875,087, Cl. 357-71.000.

Tamagawa, Itaru: *See*—
Takagi, Katsumi; Negoro, Toshihito; and Tamagawa, Itaru, 4,873,931, Cl. 112-121.110.

Tamai, Hideo: *See*—
Adachi, Kuniaki; Tamai, Hideo; and Sadai, Masanao, 4,874,791, Cl. 514-558.000.

Tamaki, Takasi: *See*—
Murakami, Kazuo; Kaneko, Yasutoshi; and Tamaki, Takasi, 4,873,905, Cl. 84-20.000.

Tamba, Shinichi; and Miyake, Hitomi, to Kawasaki Jukogyo Kabushiki Kaisha. Cylinder block construction for V-type engines. 4,873,945, Cl. 123-55.00R.

Tamol, Ronald A.; Nepomuceno, Jose G.; Keritsis, Gus D.; Burnett, George H.; Thesing, Richard A.; Winterson, Warren D.; and Nichols, Walter A., to Philip Morris Incorporated. Method and apparatus for drying and cooling extruded tobacco-containing material. 4,874,000, Cl. 131-375.000.

Tamura, Akira: *See*—
Kazama, Saburo; and Tamura, Akira, 4,875,110, Cl. 360-64.000.

Tamura, Masaru: *See*—
Kimura, Kiyoshi; Ueda, Fusao; and Tamura, Masaru, 4,874,762, Cl. 514-242.000.

Tamura, Shuichi, to Canon Kabushiki Ksisha. Distance measuring device. 4,874,239, Cl. 356-4.000.

Tan, Raul V.: *See*—
Watts, Michael P. C.; Perera, Thiloma I.; Myers, David W.; Ozarski, Robert G.; Schipper, John F.; and Tan, Raul V., 4,874,240, Cl. 356-73.000.

Tan, Robert J.: *See*—
Berry, Mark D.; Tan, Robert J.; and Garver, Robert V., 4,875,022, Cl. 333-20.000.

Tanabe, Yoshiyuki: *See*—
Kamifuji, Hiroshi; Tanabe, Yoshiyuki; and Morita, Kiyomi, 4,873,960, Cl. 123-480.000.

Tanagawa, Kouji; and Yoshida, Tomoaki, to Oki Electric Industry Co., Ltd. Computer having a protection device to selectively block incorrect control signals. 4,875,156, Cl. 364-200.000.

Tanaka, Akio: *See*—
Miner, Jay G.; Dean, Dave; Decuir, Joseph C.; Nicholson, Ronald H.; and Tanaka, Akio, 4,874,164, Cl. 273-1.00E.

Tanaka, Akira: *See*—
Watanabe, Naoto; Tanaka, Akira; Matsumoto, Takayuki; Ohmura, Yutaka; and Kojima, Hisao, 4,873,760, Cl. 29-714.000.

Tanaka, Hideki, to Mazda Motor Corporation. Air-fuel ratio control for supercharged automobile engine. 4,873,961, Cl. 123-564.000.

Tanaka, Kanji: *See*—
Ogata, Takashi; Kato, Masanori; Kawasumi, Yoshio; Tominaga, Chikara; and Tanaka, Kanji, 4,874,436, Cl. 148-2.000.

Tanaka, Katsuto: *See*—
Makita, Kensuke; Hattori, Akimasa; and Tanaka, Katsuto, 4,874,462, Cl. 156-635.000.

Tanaka, Masato; and Kan, Toshiya, to Sony Corporation. Sensorless brushless motor. 4,874,993, Cl. 318-254.000.

Tanaka, Nobuo: *See*—
Ochi, Tatsuyuki; Tanaka, Nobuo; and Mio, Kohei, 4,874,238, Cl. 356-1.000.

Tanaka, Sakae: *See*—
Furukawa, Mitsuhiko; Kitahira, Takashi; Tanaka, Sakae; and Misumi, Kiyohito, 4,874,725, Cl. 501-89.000.

Tanaka, Satoru: *See*—
Ueda, Kouichiro; Tanaka, Satoru; Kunii, Toshinobu; Kagei, Kengo; Sato, Tadashi; Ono, Hideki; Ohtsuka, Issei; Kawase, Mayumi; Ohgoh, Toshiharu; and Wakabayashi, Tsuneo, 4,874,869, Cl. 548-309.000.

Tanaka, Shinichi: *See*—
Kodo, Toshikazu; and Tanaka, Shinichi, 4,875,202, Cl. 369-32.000.

Tanaka, Yoshiaki: *See*—
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.

Tanaka, Yoshito; and Umebayashi, Nobuhiro, to Hitachi Maxell, Ltd. Magnetic head supporting device. 4,875,121, Cl. 360-129.000.

Tanamura, Toshiya: *See*—
Oku, Seiji; Shimamura, Tooru; Naganawa, Kazutomo; and Tanamura, Toshiya, 4,875,042, Cl. 340-870.170.

Tanashin Denki Co., Ltd.: *See*—
Arata, Tadao, 4,875,113, Cl. 360-74.200.

Taniguchi, Masakazu: *See*—
Ogura, Tomoyuki; Kawamura, Yasuo; Ishii, Shigeru; Baba, Masatoshi; Taniguchi, Masakazu; Hirose, Masayoshi; Hirata, Kiminori; and Ochiai, Yoshinori, 4,874,861, Cl. 544-229.000.
Tanimoto, Yoshio: *See*—
Matsui, Masataka; Aono, Toshiaki; Tanimoto, Yoshio; Nakahama, Tadamitsu; and Yamane, Takakazu, 4,874,639, Cl. 427-240.000.
Tansley, Robert W.: *See*—
Newman, Alec T.; Bentley, Andrew C.; King, Christine A.; MacMahon, Alistair J.; Tansley, Robert W.; and Gibbs, Andrew R., 4,873,915, Cl. 99-289.00R.
Tapia, Ray. Cap assembly. 4,873,726, Cl. 2-195.000.
Tatara, Yoshikuni: *See*—
Suzuki, Takami; Tatara, Yoshikuni; and Moriya, Tomoyuki, 4,874,264, Cl. 400-335.000.
Tate, Kazuyuki: *See*—
Hara, Toshihiro; Yotsutani, Akio; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, 4,875,231, Cl. 379-61.000.
Taurus Holdings, Inc.: *See*—
Groswith III, Charles T.; Seipp III, Edwin A.; Sun, Rickson; and Yurchenco, James R., 4,874,186, Cl. 281-28.000.
Taylor, Julian S. Restrictor valve flow passage pop-up wear indicator. 4,874,007, Cl. 137-312.000.
Taylor, Kenneth D., to Otis Elevator Company. Portable elevator traffic pattern monitoring system. 4,874,063, Cl. 187-130.000.
Taylor, Malcolm R.; Barr, John D.; and Smart, John R., to Reed Tool Company Limited. Manufacture of rotary drill bits. 4,873,895, Cl. 76-108.00A.
Taylor, Robert E.: *See*—
Hallam, Donald E.; Popper, Peter; Staunton, Harold F.; Taylor, Robert E.; and Yngve, Paul W., 4,873,821, Cl. 57-293.000.
TDK Corporation: *See*—
Yamamoto, Shinobu; Hoshide, Fumitoshi; Takeuchi, Michikazu; Kotani, Shou; and Yasuda, Sumihiro, 4,874,924, Cl. 219-274.000.
Teac Corporation: *See*—
Ando, Yashiko; Noda, Yasushi; and Abe, Yohji, 4,875,119, Cl. 360-105.000.
Yasuda, Kazuhiko; and Wada, Sumio, 4,875,116, Cl. 360-78.110.
Tecnocentro S.r.l.: *See*—
Crispoldi, Antonio; Moriconi, Andrea; and Chiappafreddo, Mario, 4,874,595, Cl. 423-397.000.
Tedesco, John L.: *See*—
Andrews, William H.; Brothers, Virginia M.; Files, James G.; Kuhn, Irene; McCaman, Michael T.; Paul, Leland S.; Sias, Stacey R.; Gore, Thomas C.; Newman, Karel Z., Jr.; and Tedesco, John L., 4,874,705, Cl. 435-252.330.
Teijin Limited: *See*—
Sasaki, Yoshiyuki; and Okamoto, Tetsuo, 4,874,658, Cl. 428-220.000.
Teillauchet, Eric; and Bandiera, Angelo, to Societe Nouvelle D'Exploitation La Calhene. Device for the disconnectable coupling of a toggle joint to a telemanipulator slave arm. 4,873,885, Cl. 74-520.000.
Teissier, Remy; and Clamens, Serge, to Societe Chimique des Charbonnages. Di-bishydroxypropyl cyanuric acid, trisubstituted derivatives thereof and a process for their preparation. 4,874,859, Cl. 544-221.000.
Telefind Corp.: *See*—
Andros, Andrew A.; Campana, Thomas J., Jr.; Thelen, Gary F.; and Kinast, Robert A., 4,875,039, Cl. 340-825.440.
Tensor, Inc.: *See*—
Roberts, George F.; and Walters, Philip H., 4,875,014, Cl. 324-326.000.
Terada, Michimasa; and Nakajima, Hisashi, to Tokyo Electron Limited. Mechanism for turning over a test head of a wafer probing machine. 4,875,005, Cl. 324-158.00F.
Teradyne, Inc.: *See*—
Russo, John L.; and Van der Kloot, Robert H., 4,875,210, Cl. 371-27.000.
Terakawa, Takashige: *See*—
Kikuchi, Makoto; Mori, Shinsaku; Nikawa, Yoshio; and Terakawa, Takashige, 4,873,995, Cl. 128-804.000.
Terao, Shinji; Okazaki, Hisayoshi; and Imada, Isuke, to Takeda Chemical Industries, Ltd. Benzoquinone derivatives and production thereof. 4,874,752, Cl. 536-55.200.
Terauchi, Kiyoshi: *See*—
Kobayashi, Hideto; and Terauchi, Kiyoshi, 4,874,295, Cl. 417-222.000.
Terry, Malcolm J.: *See*—
Bransden, Antony S.; Megaw, John H. P. C.; Terry, Malcolm J.; and Ward, Brooke A., 4,874,919, Cl. 219-121.680.
Terumo Kabushiki Kaisha: *See*—
Kousai, Tadashi; Ishida, Toshinobu; and Moriuchi, Yousuke, 4,874,374, Cl. 604-164.000.
Tessera-Chiesa, Emilio, to Sales S.p.A. Sealed packet with an adhesive strip for opening and reclosing. 4,874,096, Cl. 206-621.000.
Test, Howard R.: *See*—
Bednarz, George A.; Smith, Reginald W.; Roeding, Gretchen W.; and Test, Howard R., 4,874,722, Cl. 437-209.000.
Tetenborg, Konrad; Eschmann, Heinz; and Huwelmann, Helmut, to Windmoller & Holscher. Apparatus for filling and closing sacks which are open at one end. 4,873,815, Cl. 53-570.000.
Tetra Dev-Co.: *See*—
Ringdahl, Ulf; and Mattei, Vittorio, 4,874,021, Cl. 141-85.000.
TetraWerke Dr.rer.nat. U. Baensch GmbH: *See*—
Bock, Eberhard, 4,874,707, Cl. 435-253.600.
Tetreault, Andre . Valve box. 4,874,105, Cl. 220-4.00C.
Texaco Inc.: *See*—
Colvert, James H., 4,874,583, Cl. 422-143.000.
Rietsch, Eike, 4,875,197, Cl. 367-32.000.
Robison, Peter D.; and Stipanovic, Arthur J., 4,874,044, Cl. 166-275.000.
Texas Instrument Incorporated: *See*—
Rao, Kalipatnam V., 4,874,716, Cl. 437-43.000.
Texas Instruments Incorporated: *See*—
Bednarz, George A.; Smith, Reginald W.; Roeding, Gretchen W.; and Test, Howard R., 4,874,722, Cl. 437-209.000.
Bishop, Robert P.; Sabetti, Anthony J.; and Charboneau, Thomas, 4,875,135, Cl. 361-283.000.
Eklund, Robert H., 4,874,714, Cl. 437-39.000.
Hashimoto, Masashi, 4,875,212, Cl. 371-40.200.
Jucha, Rhett B.; Carter, Duane E.; Davis, Cecil J.; and Crank, Sue E., 4,874,723, Cl. 437-245.000.
Malhi, Satwinder D. S.; Shen, Chi-Cheong; Bean, Kenneth E.; and Chang, Peng-Heng, 4,875,086, Cl. 357-54.000.
McDavid, James M., 4,874,720, Cl. 437-203.000.
Paterson, James L., 4,874,715, Cl. 437-43.000.
Stierman, Roger J.; McCauley, Archie N.; and Zart, Robert C., 4,874,476, Cl. 204-15.000.
Theeuwes, Felix: *See*—
Wong, Patrick S. L.; Theeuwes, Felix; and Eckenhoff, James B., 4,874,388, Cl. 604-891.100.
Thelen, Gary F.: *See*—
Andros, Andrew A.; Campana, Thomas J., Jr.; Thelen, Gary F.; and Kinast, Robert A., 4,875,039, Cl. 340-825.440.
Thermal Syndicate P.L.C.: *See*—
Winterburn, John A., 4,874,417, Cl. 65-111.000.
Thermolytic Decomposer: *See*—
Galloway, Terry R., 4,874,587, Cl. 422-189.000.
Thesing, Richard A.: *See*—
Tamol, Ronald A.; Nepomuceno, Jose G.; Keritsis, Gus D.; Burnett, George H.; Thesing, Richard A.; Winterson, Warren D.; and Nichols, Walter A., 4,874,000, Cl. 131-375.000.
Thiele, Klaus: *See*—
Lange, Fritz; Busch, Peter; and Thiele, Klaus, 4,874,554, Cl. 260-404.000.
Thomas, Brien M.: *See*—
Grade, Reinhardt; and Thomas, Brien M., 4,874,526, Cl. 210-697.000.
Thomas, Lewis J., III: *See*—
Hunt, Thomas J.; Miller, James G.; Thomas, Lewis J., III; Melton, Hewlett E., Jr.; and Shoup, Thomas A., 4,873,984, Cl. 128-660.070.
Thomas, Michael E.: *See*—
Shurtliff, Jeffrey L.; and Thomas, Michael E., 4,873,794, Cl. 51-227.00R.
Thomas, Robert L.; Kuo, Pao-Kuang; and Favro, Lawrence D., to Wayne State University. Thermal wave imaging apparatus. 4,874,251, Cl. 374-45.000.
Thompson, Marvin W.; Jennings, Timothy C.; Scott, James A.; Phenicie, Ronald W.; Murphy, Margaret H.; Nakash, Gabriel D.; Biggers, James R.; Boudreau, Lynnlee M.; and Curiel Contreras, Jorge H., to Anvil Cases, Inc. Method and apparatus for forming a desk. 4,874,266, Cl. 403-407.100.
Thompson, Michael B., to Eaton Corporation. Flow noise suppression for electronic valves. 4,873,836, Cl. 62-158.000.
Thompson, Robert A., to General Electric Company. Shot sensing shot peening system and method. 4,873,855, Cl. 72-53.000.
Thomson-CSF: *See*—
Cheysson, Francoise; and Migozzi, Jean-Blaise, 4,874,214, Cl. 350-3.700.
Thonnelier, Jean-Yves, to L'Air Liquide, Societe Anonyme Pour L'Etude et L'Exploitation des Procedes Georges Claude. Process and installation for supplying nitrogen to an apparatus. 4,874,413, Cl. 62-23.000.
Thornton, Robert L.; and Burnham, Robert D., to Xerox Corporation. Buried waveguide window regions for improved performance semiconductor lasers and other opto-electronic applications. 4,875,216, Cl. 372-45.000.
Thuerk, Matthias: *See*—
Reiche, Dieter; Thuerk, Matthias; and Duerselen, Roderich, 4,874,677, Cl. 428-605.000.
Thurnau, Vernon L.: *See*—
Heisey, Raymond K., Jr.; Barker, W. David; Mariano, Arturo C.; and Thurnau, Vernon L., 4,873,808, Cl. 52-478.000.
Tideland Signal Corporation: *See*—
Olivenbaum, James E., 4,875,132, Cl. 361-117.000.
Tietjen, Klaus-Gunther: *See*—
Wroblowsky, Heinz-Jurgen; Kluth, Joachim; Tietjen, Klaus-Gunther; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,874,420, Cl. 71-93.000.
Tihanyi, Jenoe: *See*—
Leipold, Ludwig; Sander, Rainald; Tihanyi, Jenoe; and Weber, Roland, 4,875,131, Cl. 361-103.000.
Tilcon Tomasso: *See*—
Hurley, Irvin H., Jr., 4,874,283, Cl. 414-504.000.
Tillery, John T., to United States of America, Army. Illuminating bezel. 4,875,200, Cl. 368-67.000.
Timm, Jurgen: *See*—
Homberger, Heinrich; Timm, Jurgen; and Rodriques, Pedro, 4,874,578, Cl. 420-541.000.
Ting, Raymond M. L. Connecting means of curtainwall supporting mullions. 4,873,805, Cl. 52-235.000.

Tioxide Group PLC: *See*—
Kay, Peter D.; and McDonald, Keith, 4,874,806, Cl. 524-204.000.
Titmas, James A., to Oxidyne Corporation. Apparatus for effecting selected patterns of fluid flow. 4,874,560, Cl. 261-76.000.
Toa Eiyo, Ltd.: *See*—
Yamada, Shin-ichi; Goto, Takao; Mashiko, Toshihisa; Kogi, Kentaro; Oguchi, Yukiko; and Narita, Senichi, 4,874,760, Cl. 514-234.200.
Tobe, Yukiya: *See*—
Kimpara, Masaomi; Kawai, Kaiji; and Tobe, Yukiya, 4,874,425, Cl. 71-121.000.
Tobias, Russell H.: *See*—
Bershas, James P.; and Tobias, Russell H., 4,874,837, Cl. 528-291.000.
Todo, Akira: *See*—
Minami, Syuji; Kawamoto, Keiji; Kasai, Tetsuji; Kuroiwa, Toshiaki; and Todo, Akira, 4,874,808, Cl. 524-291.000.
Toft, Mark A.: *See*—
Brazdil, James F., Jr.; Glaeser, Linda C.; and Toft, Mark A., 4,874,738, Cl. 502-209.000.
Tohyama, Shigeru, to NEC Corporation. Optoelectric transducer. 4,875,084, Cl. 357-30.000.
Tojyo, Shigeki: *See*—
Nishimoto, Yoshiro; Yoneda, Yasuji; Imaoka, Shinichi; Nakai, Yasuhide; Nakaue, Akimitsu; Onishi, Yoshihiko; Tachibana, Hiroyuki; Inoue, Takayoshi; Kusaka, Takuya; Takamatsu, Hiroyuki; Tojyo, Shigeki; Kajikawa, Hiroshi; and Nishimura, Kozo, 4,874,939, Cl. 250-211.00J.
Tokar, Alexandr P.: *See*—
Petrov, Vyacheslav V.; Gorshkov, Nikolai V.; Antonov, Alexandr A.; Tokar, Alexandr P.; Krjuchin, Andrei A.; and Shanoilo, Semen M., 4,875,204, Cl. 369-100.000.
Tokisue, Hiromitsu; Tsumaki, Nobuo; and Koike, Toshifumi, to Hitachi, Ltd. Apparatus for holding and/or conveying articles by fluid. 4,874,273, Cl. 406-88.000.
Tokyo Electron Limited: *See*—
Terada, Michimasa; and Nakajima, Hisashi, 4,875,005, Cl. 324-158.00F.
Tokyo Keiki Co., Ltd.: *See*—
Kikuchi, Makoto; Mori, Shinsaku; Nikawa, Yoshio; and Terakawa, Takashige, 4,873,995, Cl. 128-804.000.
Tomann, Mark M.: *See*—
Anderson, Dean H.; and Tomann, Mark M., 4,875,052, Cl. 343-882.000.
Tominaga, Chikara: *See*—
Ogata, Takashi; Kato, Masanori; Kawasumi, Yoshio; Tominaga, Chikara; and Tanaka, Kanji, 4,874,436, Cl. 148-2.000.
Tonegawa, Susumu: *See*—
Saito, Haruo; Kranz, David M.; Eisen, Herman N.; and Tonegawa, Susumu, 4,874,845, Cl. 530-395.000.
Toray Industries: *See*—
Ando, Katsutoshi; and Ogawa, Yo, 4,874,659, Cl. 428-221.000.
Toray Silicone Company, Ltd.: *See*—
Suzuki, Toshio; and Okawa, Tadashi, 4,874,881, Cl. 556-453.000.
Torigoe, Makoto; and Suzuki, Akiyoshi, to Canon Kabushiki Kaisha. Exposure apparatus. 4,875,076, Cl. 355-53.000.
Toriya, Hajime: *See*—
Sakurai, Shigeo; Umezawa, Sadao; Usami, Saburo; Miyata, Hiroshi; Toriya, Hajime; Tsubouchi, Kuniyoshi; and Kaneko, Ryoichi, 4,875,170, Cl. 364-507.000.
Torley, Jozsef: *See*—
Lapis, Erzsebet; Toth, Edit; Kiss, Bela; Torley, Jozsef; Palosi, Eva; Hajdu, Istvan; Szporny, Laszlo ; Groo, Dora; and Laszlovszky, Istvan, 4,874,765, Cl. 514-255.000.
Tornactore, Giovanni: *See*—
Amedei, Giuseppe; and Tornactore, Giovanni, 4,873,880, Cl. 74-336.00R.
Torrington Company, The: *See*—
Podhajecki, Stephen T., 4,874,260, Cl. 384-470.000.
Toshiba Monofrax Co., Ltd.: *See*—
Hirata, Kimio; and Saito, Yasuo, 4,874,034, Cl. 165-9.100.
Toth, Edit: *See*—
Lapis, Erzsebet; Toth, Edit; Kiss, Bela; Torley, Jozsef; Palosi, Eva; Hajdu, Istvan; Szporny, Laszlo ; Groo, Dora; and Laszlovszky, Istvan, 4,874,765, Cl. 514-255.000.
Toto Ltd.: *See*—
Ito, Haruyuki; and Matsumoto, Akio, 4,874,304, Cl. 425-84.000.
Toyama, Hiroaki, to Kabushiki Kaisha Murakoshi Seiko. Hinge. 4,873,743, Cl. 16-237.000.
Toyo Communication Equipment Co., Ltd.: *See*—
Oshita, Masahide; Isai, Masaaki; and Fukunaka, Toshiaki, 4,874,438, Cl. 148-400.000.
Toyo Ink Manufacturing Co., Ltd.: *See*—
Nonomura, Tsutomu; and Abe, Hidetoshi, 4,873,924, Cl. 101-146.000.
Toyoda Gosei Co., Ltd.: *See*—
Ito, Toshiyasu; Minoura, Jun; Mori, Takaaki; Takahashi, Shigeyuki; Kato, Mamoru; Shimada, Junichi; and Hayakawa, Fujio, 4,874,229, Cl. 350-357.000.
Toyoda-Koki Kabushiki-Kaisha: *See*—
Asano, Hiroaki; Tsujiuchi, Toshio; Yoneda, Takao; Ishihara, Nobuhiro; Maruyama, Toshio; and Ohta, Norio, 4,873,793, Cl. 51-165.710.
Toyota Jidosha Kabushi Kaisha: *See*—
Yamada, Ichiji; Inuzuka, Yutake; Ichihara, Isao; Murakami, Michiyuki; Suzuki, George; Yanahashi, Ryou; and Kondo, Takeshi, 4,873,884, Cl. 74-473.00P.
Toyota Jidosha Kabushiki Kaisha: *See*—
Fukuta, Kenji; Kaneko, Takaoki; and Takahashi, Yoshinobu, 4,874,453, Cl. 156-345.000.
Hamaguchi, Shigeki; Ohtsuka, Yasuhiro; Motohiro, Tomoyoshi; Taga, Yasunori; and Ishii, Masahiko, 4,874,664, Cl. 428-325.000.
Kasegawa, Norimichi, 4,874,059, Cl. 180-249.000.
Kitoh, Osamu; and Ohashi, Masahiko, 4,874,650, Cl. 428-68.000.
Kojima, Fumio; Tachiiri, Yoshikazu; and Kato, Yoshihisa, 4,874,174, Cl. 285-82.000.
Miyamaru, Tsuneo, 4,874,254, Cl. 374-208.000.
Tracy, Richard J. Attachment for slide fastener slider pull tab. 4,873,750, Cl. 24-429.000.
Tracy, William J., III: *See*—
Bartilucci, Mark P.; Karsner, Grant G.; and Tracy, William J., III, 4,874,505, Cl. 208-131.000.
Tragatschnig, Joerg, to Porsche Design GmbH. Telephone. 4,875,234, Cl. 379-434.000.
Trainer, William E.: *See*—
Roberts, Auston K.; Trainer, William E.; and Biederman, David L., 4,874,593, Cl. 423-322.000.
TRC, Inc.: *See*—
McPherson, Walter K.; and Blaker, James L., 4,873,867, Cl. 73-493.000.
Tremblay, Robert A.: *See*—
Labombarde, Raymond A.; and Tremblay, Robert A., 4,873,813, Cl. 53-438.000.
Tripp, Victor: *See*—
Harms, Frank M.; Tripp, Victor; and Wells, Thomas B., 4,874,915, Cl. 219-10.55F.
Trippe, Jerry C.: *See*—
Foreman, Michael R.; Hadermann, Albert F.; and Trippe, Jerry C., 4,874,528, Cl. 210-705.000.
Troxler Electronic Laboratories, Inc.: *See*—
Regimand, Ali, 4,874,950, Cl. 250-390.040.
Truelove, Ronald D.: *See*—
Goodson, Thomas A.; and Truelove, Ronald D., 4,873,849, Cl. 70-54.000.
Trumbull, Douglas; Collins, David; Smith, Wayne; and Spieldiener, Robert, to Showscan Film Corporation. Motion picture amusement ride. 4,874,162, Cl. 272-18.000.
TRW Inc.: *See*—
Egense, Andrea L. F.; and Kuenzly, John D., 4,873,930, Cl. 110-345.000.
Tschirske, Carsten: *See*—
Yong, Bak G.; Petra, Barth; Dietrich, Demus; Detlev, Joachimi; Kampa, Barbara; Kohler, Saskia; Mohr, Kristine; Paschke, Reinhard; Pelzl, Gerhard; Rosenfeld, Ulrich; Schafer, Wolfgang; Scherf, Klaus-Dieter; Tschirske, Carsten; Weissflog, Wolfgang; and Zaschke, Horst, 4,874,544, Cl. 252-299.610.
Tseng, Kenneth K. S.: *See*—
Hung, Paul L. K.; and Tseng, Kenneth K. S., 4,874,799, Cl. 522-96.000.
Tseng, Raymond R., to Allied-Signal Inc. Method for improving signal-to-noise ratios in fluidic circuits and apparatus adapted for use therewith. 4,874,016, Cl. 137-826.000.
Tsubakimoto Chain Co.: *See*—
Suzuki, Tadasu, 4,874,352, Cl. 474-110.000.
Yaguchi, Akio; and Kyoo, Takatsugu, 4,874,077, Cl. 198-408.000.
Tsubouchi, Kuniyoshi: *See*—
Sakurai, Shigeo; Umezawa, Sadao; Usami, Saburo; Miyata, Hiroshi; Toriya, Hajime; Tsubouchi, Kuniyoshi; and Kaneko, Ryoichi, 4,875,170, Cl. 364-507.000.
Tsuchitani, Masatoshi; and Naito, Sakae, to Maruzen Petrochemical Co., Ltd. Method of purifying coal tars for use in the production of carbon products. 4,874,502, Cl. 208-45.000.
Tsuchiya, Nobuo: *See*—
Hamada, Takao; Tsuchiya, Nobuo; Inatani, Toshihiro; Katayama, Eiji; Koitabashi, Toshimitsu; Okabe, Kyoji; Sumito, Mitsuo; and Takada, Yoshiyasu, 4,874,427, Cl. 75-26.000.
Tsuda Industries, Co., Ltd.: *See*—
Yamada, Ichiji; Inuzuka, Yutake; Ichihara, Isao; Murakami, Michiyuki; Suzuki, George; Yanahashi, Ryou; and Kondo, Takeshi, 4,873,884, Cl. 74-473.00P.
Tsugita, Hiroshi: *See*—
Sakamoto, Hideo; and Tsugita, Hiroshi, 4,875,002, Cl. 324-73.00R.
Tsujimura, Masao: *See*—
Kubodera, Takayuki; Nakamura, Shizuo; Onizawa, Masanori; Shiroshita, Hirotaka; Mochizuki, Eiichi; Tsujimura, Masao; Atsuta, Toshikatsu; and Morooka, Takayoshi, 4,875,065, Cl. 354-82.000.
Tsujino, Yoshikazu; Hamada, Yuuji; Sakata, Masakazu; Fujii, Takanori; and Kuwano, Yukinori, to Sanyo Electric Co., Ltd. Ultrafine tube and method for its production. 4,874,646, Cl. 428-34.100.
Tsujiuchi, Toshio: *See*—
Asano, Hiroaki; Tsujiuchi, Toshio; Yoneda, Takao; Ishihara, Nobuhiro; Maruyama, Toshio; and Ohta, Norio, 4,873,793, Cl. 51-165.710.
Tsumaki, Nobuo: *See*—
Tokisue, Hiromitsu; Tsumaki, Nobuo; and Koike, Toshifumi, 4,874,273, Cl. 406-88.000.

Tsunoda, Eiji: *See*—
Hadano, Yoshikazu; Tsunoda, Eiji; and Kajigaya, Ichiro, 4,873,827, Cl. 60-646.000.
Tsunooka, Tsutomu: *See*—
Ohya, Kanji; Tsunooka, Tsutomu; Ogura, Koji; Ozeki, Hirofumi; and Yamamoto, Takashi, 4,874,727, Cl. 501-134.000.
Tsushima, Tetsurou: *See*—
Okubo, Osamu; Kato, Takeo; and Tsushima, Tetsurou, 4,874,918, Cl. 219-85.110.
Tuan, James: *See*—
Katz, Leonard; Tuan, James; and McAlpine, James B., 4,874,748, Cl. 514-29.000.
Tulp, Martinus T. M.: *See*—
Van Wijngaarden, Ineke; Kruse, Cornelis; Van Der Heyden, Johannes A. M.; and Tulp, Martinus T. M., 4,874,770, Cl. 514-326.000.
Turchik, Randy: *See*—
Olodort, Robert; Micalizzi, Charles; Cambruzzi, Louis; and Turchik, Randy, 4,875,174, Cl. 364-519.000.
Turner, Anthony L., to Turner International (Engineering) Limited. Laterally adjustable mower. 4,873,818, Cl. 56-10.800.
Turner International (Engineering) Limited: *See*—
Turner, Anthony L., 4,873,818, Cl. 56-10.800.
Turner, Larry G.: *See*—
Pickerrell, Daniel A.; Schrock, Donald C.; and Turner, Larry G., 4,874,009, Cl. 137-454.600.
Turner, Stephen M.: *See*—
Szymanski, Thomas; and Turner, Stephen M., 4,874,586, Cl. 422-177.000.
Ube Industries, Ltd.: *See*—
Hamasaki, Naotaka; Kawamura, Hirotaka; Ohtsu, Norio; Nakakoshi, Ichiro; Ataka, Kikuo; Oomori, Kiyosi; and Kouno, Masahiko, 4,874,882, Cl. 558-131.000.
Shiomi, Yasushi; Matsuzaki, Tokuo; and Masunaga, Katsuro, 4,874,888, Cl. 560-204.000.
Uchytil, Thomas F.: *See*—
Durbin, Richard D.; Lukens, Jean H.; Uchytil, Thomas F.; and Rhodehamel, Nicholas, 4,874,706, Cl. 435-253.300.
Ueda, Fusao: *See*—
Kimura, Kiyoshi; Ueda, Fusao; and Tamura, Masaru, 4,874,762, Cl. 514-242.000.
Ueda, Hiraki; Miyamoto, Hisashi; Aki, Shinji; and Otsuka, Tatsuya, to Otsuka Pharmaceutical Company, Limited. Benzoheterocyclic compounds. 4,874,764, Cl. 514-254.000.
Ueda, Kouichiro; Tanaka, Satoru; Kunii, Toshinobu; Kagei, Kengo; Sato, Tadashi; Ono, Hideki; Ohtsuka, Issei; Kawase, Mayumi; Ohgoh, Toshiharu; and Wakabayashi, Tsuneo, to Eisai Co., Ltd. Hydantoin derivatives and medicines containing the same. 4,874,869, Cl. 548-309.000.
Ueda, Masashi; Horaguchi, Yoichi; and Sakakibara, Kenji, to Brother Kogyo Kabushiki Kaisha. Color picture image recording apparatus capable of adjusting color tone in the copy sheet. 4,875,073, Cl. 355-27.000.
Ueno, Katsunobu; and Hataishi, Osamu, to Fujitsu Limited. Semiconductor device with shallow n-type region with arsenic or antimony and phosphorus. 4,875,085, Cl. 357-34.000.
Ueshin, Akito: *See*—
Nakahara, Jirou; Ueshin, Akito; and Okajima, Shiro, 4,874,934, Cl. 235-492.000.
Uesugi, Mitsuaki; Inomata, Masaichi; and Komine, Isamu, to NKK Corporation. Method and apparatus for measuring a three-dimensional curved surface shape. 4,874,955, Cl. 250-550.000.
Ueyama, Yoshiji; and Asayama, Yoshiaki, to Mitsubishi Denki Kabushiki Kaisha. Throttle valve control apparatus. 4,873,957, Cl. 123-399.000.
Ui, Kazuo: *See*—
Matsuda, Tsukasa; Ui, Kazuo; and Maeda, Hiroshi, 4,874,089, Cl. 206-397.000.
Ullrich, Gunter: *See*—
Andra, Rainer; Kurr, Klaus; Ullrich, Gunter; and Dorge, Udo, 4,873,887, Cl. 74-573.00F.
Ulm, John G., to Liqui-Box Corporation. Decap dispensing system for water cooler bottles. 4,874,023, Cl. 141-346.000.
Umebayashi, Nobuhiro: *See*—
Tanaka, Yoshito; and Umebayashi, Nobuhiro, 4,875,121, Cl. 360-129.000.
Umeda, Osamu; Nakakusu, Tohru; Sato, Makoto; and Shimazaki, Tatsuo, to Casio Computer Co., Ltd. Projector apparatus with mirror means. 4,875,064, Cl. 353-78.000.
Umehara, Yohichi: *See*—
Wakabayashi, Ataru; Umehara, Yohichi; Morie, Satsuki; Kuwahara, Ikuro; and Okada, Yoshimi, 4,874,483, Cl. 204-94.000.
Umezawa, Sadao: *See*—
Sakurai, Shigeo; Umezawa, Sadao; Usami, Saburo; Miyata, Hiroshi; Toriya, Hajime; Tsubouchi, Kuniyoshi; and Kaneko, Ryoichi, 4,875,170, Cl. 364-507.000.
Umholtz, Franklyn G. Combined egg poacher and serving plate. 4,873,922, Cl. 99-426.000.
Unangst, Paul C.: *See*—
Carethers, Mary E.; Centenko, Wiaczeslaw A.; Connor, David T.; Johnson, Elizabeth A.; Kiely, John S.; Schwender, Charles F.; Sircar, Jagadiah C.; Sorenson, Roderick J.; Unangst, Paul C.; and Bruns, Robert F., 4,874,758, Cl. 514-226.500.
Unimation, Inc.: *See*—
Daggett, Kenneth E.; Onaga, Eimei M.; Casler, Richard J., Jr.; and Johnson, Richard A., 4,874,997, Cl. 318-568.100.
Union Camp Corporation: *See*—
Mitchell, Peter W. D., 4,874,900, Cl. 568-390.000.
Union Carbide Corporation: *See*—
Koleske, Joseph V.; and Kwiatkowski, George T., 4,874,798, Cl. 522-31.000.
Union Oil Company of California: *See*—
Featherstone, John L.; Spang, S. Timothy; Newell, David G.; and Gallup, Darrell L., 4,874,529, Cl. 210-713.000.
Unisys Corporation: *See*—
Kregness, Glen R.; and Quinton, Walter L., 4,875,180, Cl. 364-715.030.
Lahti, Archie E., 4,875,161, Cl. 364-200.000.
United Brands Company: *See*—
Sole, Pedro, 4,874,617, Cl. 426-49.000.
United Catalyst Inc.: *See*—
Eilliott, Donald R.; and Beall, Gary W., 4,874,728, Cl. 501-148.000.
United Kingdom Atomic Energy Authority: *See*—
Steele, David F., 4,874,485, Cl. 204-130.000.
United Parcel Service of America, Inc.: *See*—
Chandler, Donald G.; Batterman, Eric P.; and Shah, Govind, 4,874,936, Cl. 235-494.000.
United States of America
Air Force: *See*—
McCoy, Joseph R., 4,874,910, Cl. 174-152.0GM.
Shurtliff, Jeffrey L.; and Thomas, Michael E., 4,873,794, Cl. 51-227.00R.
Smith, Leroy H., Jr.; and Wilcox, Donald E., 4,874,289, Cl. 415-150.000.
Army: *See*—
Berry, Mark D.; Tan, Robert J.; and Garver, Robert V., 4,875,022, Cl. 333-20.000.
Boyd, Phillip R., 4,875,004, Cl. 324-158.00D.
Matuska, David G.; and Ferris, Donald L., 4,874,292, Cl. 416-140.000.
Russell, Stephen D., 4,875,219, Cl. 372-92.000.
Tillery, John T., 4,875,200, Cl. 368-67.000.
Energy: *See*—
Kazmerski, Lawrence L., 4,874,946, Cl. 250-309.000.
McPherson, Daniel W.; Fowler, Joanna S.; and Wolf, Alfred P., 4,874,600, Cl. 424-1.100.
National Aeronautics and Space Administration: *See*—
Holmes, Harlan K.; Moore, Thomas C., Jr.; and Fantl, Andrew J., 4,873,990, Cl. 128-748.000.
Navy: *See*—
Marolda, Victor J., Jr., 4,874,326, Cl. 439-273.000.
U.S. Philips Corporation: *See*—
Delpech, Guy; and Garnier, Gilles, 4,875,140, Cl. 361-412.000.
Den Boef, Arie J., 4,874,246, Cl. 356-375.000.
Easton, Brian C.; and Whiffin, Peter A. C., 4,874,634, Cl. 427-54.100.
Fink, Mathias, 4,873,869, Cl. 73-626.000.
Gehrt, Heinz H.; Hildebrandt, Gunter; and Rehfeldt, Karl-Heinz, 4,874,966, Cl. 307-291.000.
Haghiri, Mohammad-Reza; and Boutrois, Bertrand, 4,875,094, Cl. 358-105.000.
Koster, Marinus P.; Bouwens, Henricus J. J.; Van Tartwijk, Anton A. J.; and De Peuter, Willem L. G., 4,874,286, Cl. 414-744.500.
Overdijk, Dik R.; Bolder, Antonius J. J.; Beirens, Leopold C. M.; and Van Rens, Piet C. J., 4,874,982, Cl. 313-440.000.
Sluyterman, Albertus A. S., 4,874,983, Cl. 313-440.000.
van der Eijk, Bart; van de Wiel, Johannes N.; Rongen, Engelbertus; and Wulms, Christiaan J. G. H., 4,874,987, Cl. 313-525.000.
Van Twist, Robert A. H.; Hopmans, Franciscus P. M.; and Odijk, Eddy A. M., 4,875,207, Cl. 370-85.120.
U.S. Printcraft: *See*—
Talalay, Anselm; and Borsvold, Herbert H., 4,874,454, Cl. 156-359.000.
United Technologies Automotive, Inc.: *See*—
Gutman, Robert F.; and Migrin, Robert, 4,874,224, Cl. 350-174.000.
Harms, Louis C., 4,873,817, Cl. 56-10.200.
United Technologies Corporation: *See*—
Cusack, Michael D., 4,875,138, Cl. 174-52.400.
Martin, Anthony N., 4,875,168, Cl. 364-431.010.
Walker, Raymond M.; Achor, Donald P.; Baumgarten, Robert W.; and Bogard, Ralph B., 4,873,751, Cl. 29-156.80B.
Unitika Ltd.: *See*—
Kubo, Eiichi; Nagaoka, Koichi; Miyahara, Yoshiki; Kiriyama, Syunichi; and Mishima, Yasunobu, 4,874,666, Cl. 428-398.000.
Universal Plastics Incorporated: *See*—
Lafever, Alan W., 4,873,774, Cl. 36-61.000.
Universite De Clermont II, Laboratoire De Photochimie: *See*—
Arnaud, Rene; Gardette, Jean-Luc; and Lamaire, Jacques, 4,874,952, Cl. 250-455.100.
Universite de Reims Champagne-Ardenne: *See*—
Egee, Michel; Dartois, Robert; Marx, Jean; Merienne, Etienne; Regalia, Marcel; Poplimont, Philippe; and Van Schel, Etienne, 4,875,175, Cl. 364-551.010.
University of California, The Regents of the: *See*—
Coldren, Larry A.; and Skidmore, Jay A., 4,874,459, Cl. 156-643.000.
University of Chicago: *See*—
Fencil, Laura E.; Metz, Charles E.; and Doi, Kunio, 4,875,165, Cl. 364-413.220.
University of Cincinnati: *See*—
Nordlund, James J.; and Rheins, Lawrence A., 4,874,744, Cl. 514-13.000.

University of Missouri, The Curators of the: *See*—
Liapis, Athanasios I.; Findley, Marshall E.; and Nguyen, Hoa T., 4,874,524, Cl. 210-672.000.
University of Rochester: *See*—
Plewes, Donald B., 4,875,226, Cl. 378-146.000.
University of Sydney: *See*—
Roberts, Bryan W.; Fien, Alan R.; and Blackler, John, 4,874,291, Cl. 416-122.000.
University of Utah Research Institute: *See*—
Ward, Stanley H., 4,875,015, Cl. 324-323.000.
University of Victoria: *See*—
O'Brien, R. N.; and Santhanam, K. S. V., 4,874,735, Cl. 502-159.000.
Uno, Tetsuya: *See*—
Kato, Masaaki; Uno, Tetsuya; Kobayashi, Masao; and Osuga, Naoto, 4,874,890, Cl. 560-205.000.
UOP: *See*—
House, David W.; and Scott, Ray V., Jr., 4,874,831, Cl. 528-48.000.
Markovs, John, 4,874,525, Cl. 210-673.000.
Miller, James G.; and Rabo, Jule A., 4,874,732, Cl. 502-74.000.
Miller, James G.; and Rabo, Jule A., 4,874,733, Cl. 502-74.000.
Olson, Kurt D.; and Kaiser, Steven W., 4,874,896, Cl. 564-479.000.
Sachtler, J. W. Adriaan; and Lawson, R. Joe, 4,874,731, Cl. 502-66.000.
Staniulis, Mark T.; and Risch, Alan P., 4,874,590, Cl. 423-239.000.
Upchurch, Ray, to French Oil Mill Machinery Co., The. Soybean process. 4,874,555, Cl. 260-412.400.
Uphues, Guenter; Ploog, Uwe; and Bischof, Klaudia, to Henkel Kommanditgesellschaft auf Aktien. Process for the production and isolation of monoalkyl phosphoric acid esters. 4,874,883, Cl. 558-150.000.
Urabe, Yoshihiko; Higashi, Tatsuji; Takahashi, Hiroshi; and Kita, Nobuyuki, to Fuji Photo Film Co., Ltd. Photosensitive lithographic plate necessitating no dampening water. 4,874,686, Cl. 430-272.000.
Urai, Muneharu, to Tachi-S Co., Ltd. Method of making seat-like object. 4,874,448, Cl. 156-196.000.
Urata, Yasuhiro: *See*—
Fujiyoshi, Yoshihiro; Aoki, Takatoshi; and Urata, Yasuhiro, 4,873,949, Cl. 123-90.120.
Urban, Donald P.: *See*—
Atlas, George N.; Donnally, Leroy C.; Urban, Donald P.; Perkins, James M.; and Wilson, Timothy C., 4,874,308, Cl. 425-544.000.
Urban, Frank J., to Pfizer Inc. Process for optically active 3-(methanesulfonyloxy)thiolane and analogs. 4,874,877, Cl. 549-66.000.
Urban, Joseph J., Jr.; Henderson, Norman; and Behe, Anthony J., to Hoechst-Roussel Pharmaceuticals Inc. Stabilized delayed release emulsion. 4,874,605, Cl. 424-78.000.
Urlaub, Herbert: *See*—
Chakraborty, Asok; Urlaub, Herbert; Grof, Franz; and Cosack, Klaus, 4,874,513, Cl. 210-321.840.
Usami, Saburo: *See*—
Sakurai, Shigeo; Umezawa, Sadao; Usami, Saburo; Miyata, Hiroshi; Toriya, Hajime; Tsubouchi, Kuniyoshi; and Kaneko, Ryoichi, 4,875,170, Cl. 364-507.000.
Ushimaru, Koichi; Hamakawa, Tomoaki; and Koga, Tomio, to Nippon Shinyaku Co., Ltd. Nifedipine compositions and the production thereof. 4,874,774, Cl. 514-356.000.
Usui, Makoto: *See*—
Murai, Katsumi; and Usui, Makoto, 4,875,211, Cl. 371-40.100.
Utah Bioreseach, Inc.: *See*—
Brimhall, Owen D.; Peterson, Stephen C.; Kotlyar, Oleg; and Ghosh Roy, Dilip N., 4,874,358, Cl. 494-37.000.
Utah Medical Products: *See*—
Wallace, William D., 4,873,986, Cl. 128-670.000.
Utaka, Katsuyuki; Sakai, Kazuo; Matsushima, Yuichi; and Akiba, Shigeyuki, to Kokusai Denshin Denwa Kabushiki Kaisha. Variable-waveguide optical branching filter. 4,874,216, Cl. 350-96.190.
UTB Umweltechnik Buchs AG: *See*—
Gorlich, Lothar, 4,874,589, Cl. 423-220.000.
V.B. Di Gamberini Enzo: *See*—
Gamberini, Enzo, 4,874,280, Cl. 414-234.000.
Vacha, Lubos J. B.; Schultz, Peter C.; Moynihan, Cornelius T.; Raychaudhuri, Satyabrata; Cadien, Ken C.; Harbison, Barry B.; and Mossadegh, Reza, to SpecTran Corporation. Hermetic coatings for non-silica based optical fibers. 4,874,222, Cl. 350-96.340.
Vadnais, Timothy W.; and Hennenfent, Douglas J., to Impris Technology Incorporated. Granule vise for manufacturing a magnetic head core with a glass fillet adjacent the inner edge of the gap. 4,874,922, Cl. 219-243.000.
Vahrenwald, Michael C.; and Brown, John A. Wiping mirror assembly. 4,873,740, Cl. 15-250.00B.
Vaisala Oy: *See*—
Kuisma, Heikki, 4,875,134, Cl. 361-282.000.
Valasek, Raymond J., to Chromatic Paint Corporation. Sealer for containers. 4,874,108, Cl. 220-93.000.
Valeo: *See*—
Casse, Pierre; and Chasseguet, Gustave, 4,874,350, Cl. 464-68.000.
Valmet Paper Machinery Inc.: *See*—
Eskelinen, Juhani, 4,873,939, Cl. 118-410.000.
Vanaschen, Luc: *See*—
Kuster, Hans-Werner; Radermacher, Herbert; and Vanaschen, Luc, 4,874,418, Cl. 65-348.000.
Van Bogaert, Philippe; and Vandenbroucke, Andre , to Picanol N.V. Transmission for weaving looms. 4,874,018, Cl. 139-1.00E.
Vandenbroucke, Andre : *See*—
Van Bogaert, Philippe; and Vandenbroucke, Andre , 4,874,018, Cl. 139-1.00E.
Vanderbilt University: *See*—
Harris, Thomas R.; and Galloway, Robert L., Jr., 4,874,949, Cl. 250-343.000.
van der Does, Thomas: *See*—
Bickelhaupt, Friedrich; and van der Does, Thomas, 4,874,897, Cl. 568-13.000.
van der Eijk, Bart; van de Wiel, Johannes N.; Rongen, Engelbertus; and Wulms, Christiaan J. G. H., to U.S. Philips Corporation. Modular X-ray image intensifier tube. 4,874,987, Cl. 313-525.000.
Van Der Heyden, Johannes A. M.: *See*—
Van Wijngaarden, Ineke; Kruse, Cornelis; Van Der Heyden, Johannes A. M.; and Tulp, Martinus T. M., 4,874,770, Cl. 514-326.000.
Van der Kloot, Robert H.: *See*—
Russo, John L.; and Van der Kloot, Robert H., 4,875,210, Cl. 371-27.000.
Van Der Meer, Roelof: *See*—
Lee, Gim F., Jr.; Heuschen, Jean M.; and Van Der Meer, Roelof, 4,874,810, Cl. 524-505.000.
van de Wiel, Johannes N.: *See*—
van der Eijk, Bart; van de Wiel, Johannes N.; Rongen, Engelbertus; and Wulms, Christiaan J. G. H., 4,874,987, Cl. 313-525.000.
Van Eyden, Gerbrand J. M.: *See*—
Honders, Anthonie; Horstik, Alfred J.; and Van Eyden, Gerbrand J. M., 4,874,482, Cl. 204-60.000.
Van Rens, Piet C. J.: *See*—
Overdijk, Dik R.; Bolder, Antonius J. J.; Beirens, Leopold C. M.; and Van Rens, Piet C. J., 4,874,982, Cl. 313-440.000.
Van Schel, Etienne: *See*—
Egee, Michel; Dartois, Robert; Marx, Jean; Merienne, Etienne; Regalia, Marcel; Poplimont, Philippe; and Van Schel, Etienne, 4,875,175, Cl. 364-551.010.
Van Sickle, Richard G.; and Bour, George, to GTE Valeron Corporation. Dimensioning head for plug gage. 4,873,768, Cl. 33-178.00R.
Van Tartwijk, Anton A. J.: *See*—
Koster, Marinus P.; Bouwens, Henricus J. J.; Van Tartwijk, Anton A. J.; and De Peuter, Willem L. G., 4,874,286, Cl. 414-744.500.
Van Twist, Robert A. H.; Hopmans, Franciscus P. M.; and Odijk, Eddy A. M., to U.S. Philips Corporation. A data processing network with chordal ring factor network. 4,875,207, Cl. 370-85.120.
Van Wijngaarden, Ineke; Kruse, Cornelis; Van Der Heyden, Johannes A. M.; and Tulp, Martinus T. M., to Duphar International Research B.V. Aryl-substituted (N-piperidinyl)methyl- and (N-piperidinyl) methylazoles having antipsychotic properties. 4,874,770, Cl. 514-326.000.
Vasiliou, Eustathios: *See*—
Nowak, Thomas E.; Smith, Edward J.; and Vasiliou, Eustathios, 4,874,277, Cl. 411-61.000.
Vaudreuil, Ghislain: *See*—
Cielo, Paolo; Krapez, Jean-Claude; Cole, Kenneth C.; and Vaudreuil, Ghislain, 4,874,948, Cl. 250-341.000.
Veb Hockvakuum Dresden: *See*—
Reiche, Dieter; Thuerk, Matthias; and Duerselen, Roderich, 4,874,677, Cl. 428-605.000.
VEB Kombinat Textima: *See*—
Frenzel, Bertram; Grenzendorfer, Dietmar; Kemter, Heinz; Wunsch, Wolfgang; and Zeisberg, Peter, 4,873,844, Cl. 66-84.00A.
VEB Werk fuer Fernsehelektronik im VEB Kombinat Mikroelektronik: *See*—
Yong, Bak G.; Petra, Barth; Dietrich, Demus; Detlev, Joschimi; Kampa, Barbara; Kohler, Saskia; Mohr, Kristine; Paschke, Reinhard; Pelzl, Gerhard; Rosenfeld, Ulrich; Schafer, Wolfgang; Scherf, Klaus-Dieter; Tschirske, Carsten; Weissflog, Wolfgang; and Zaschke, Horst, 4,874,544, Cl. 252-299.610.
Vedamuthu, Ebenezer R., to Microlife Technics, Inc. Method for producing mucoid and phage resistant group N streptococcus strains from non-mucoid and phage sensitive parent strains. 4,874,616, Cl. 426-43.000.
Velie, Wallace W., to Mallard Products, Inc. Magnetic operator flow device. 4,874,012, Cl. 137-557.000.
Velke, David C., Sr.; Marsden, George P.; and Leffingwell, Burton C. Electrical splice connector. 4,874,909, Cl. 174-845.000.
Venture Packaging, Inc.: *See*—
Baines, Patrick A., 4,874,256, Cl. 383-21.000.
Vergote, Geert R. J.: *See*—
Snauwaert, Paul E. M.; Vergote, Geert R. J.; and Witdoek, Daniel C., 4,874,411, Cl. 55-290.000.
Vernice, Gerald G.: *See*—
Huang, Chialang; and Vernice, Gerald G., 4,874,902, Cl. 568-683.000.
Verstrate, Gary W.: *See*—
Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., 4,874,820, Cl. 525-240.000.
Vetter, Udo J., to Arzheimittel GmbH Apotheker Vetter & Co. Ravensburg. Hypodermic syringe. 4,874,381, Cl. 604-191.000.
Vian, Joel: *See*—
Peglion, Jean L.; Poignant, Jean C.; and Vian, Joel, 4,874,878, Cl. 549-462.000.
Vignotto, Angelo: *See*—
Colanzi, Franco; and Vignotto, Angelo, 4,874,261, Cl. 384-484.000.
Vinton, Brock J.: *See*—
Canzano, Pasquale S.; and Vinton, Brock J., 4,874,011, Cl. 137-505.130.
Viramontes, Jose A. Bracket assembly and plant leaf lifter and protector. 4,873,788, Cl. 47-1.700.

Virginia Commonwealth University: *See*—
Holmes, Harlan K.; Moore, Thomas C., Jr.; and Fantl, Andrew J., 4,873,990, Cl. 128-748.000.
Virginia Plastics Company: *See*—
Bogese, Stephen B., II; and Hall, Charles E., 4,874,330, Cl. 439-418.000.
Viscodrive GmbH: *See*—
Kwoka, Georg, 4,874,058, Cl. 180-248.000.
Viskase Corporation: *See*—
Evyan, John J.; and Booth, Orville D., 4,873,748, Cl. 17-49.000.
Gaynor, Dennis A.; and Hansen, James R., 4,874,622, Cl. 426-135.000.
Vitovec, Jaroslav; Cermak, Jan; and Smolik, Jiri , to Ceskoslovenska akademie ved. Equipment for continuous separation of small particles and vapours of sublimable compounds. 4,874,409, Cl. 55-267.000.
Vivian, Domenico: *See*—
Mainardi, Bruno; and Vivian, Domenico, 4,874,298, Cl. 417-315.000.
Voest-Alpine Aktiengesellschaft: *See*—
Papst, Gero; and Nagl, Michael, 4,874,037, Cl. 165-47.000.
Vogel, Jacobus E., to Shell Oil Company. Process for purifying and cooling a hot gas. 4,874,402, Cl. 55-22.000.
Volkert, John K., to One Up, Inc. Method of making a piece containing multiple pop-ups. 4,874,356, Cl. 493-335.000.
Volonta, Piero; and Picciriello, Matteo, to Fiat Auto S.p.A. Method for obtaining electrical earth connection device, particularly for vehicles. 4,873,763, Cl. 29-825.000.
Volten, Curt V., to Spectra-Physics, Inc. Multiple source and/or sensor coldhead mount. 4,873,843, Cl. 62-51.100.
Von Roll, AG.: *See*—
Spiess, Hansruedi; and Galvanetto, Francois, 4,873,795, Cl. 52-20.000.
Vonasek, Jiri, to Markpoint System AB. Valve device for a matrix printer. 4,875,058, Cl. 346-140.00R.
von Ballmoos, Roland; and Ryan, Francis X., to Mobil Oil Corporation. pH control by bulky organic bases during noble-metal exchange of zeolite catalysts. 4,874,504, Cl. 208-111.000.
von der Saal, Wolfgang: *See*—
Mertens, Alfred; von der Saal, Wolfgang; Berger, Herbert; Muller-Beckmann, Bernd; and Strein, Klaus, 4,874,756, Cl. 514-212.000.
VonDeylen, Vernon F.: *See*—
Minuhin, Vadim B.; Berzon, Evgeny J.; and VonDeylen, Vernon F., 4,875,108, Cl. 360-51.000.
Voorhis, Roger J.; and Palmer, John M., to Carrier Corporation. Refrigerant metering in a variable flow system. 4,873,838, Cl. 62-207.000.
Voss, David L.; DeCamp, Howard S.; and Culp, Gordon W., to Sierracin Corporation. Electroconductive film system for aircraft windows. 4,874,930, Cl. 219-522.000.
Vulcan Equipment Company: *See*—
Bubik, Leslie, 4,874,285, Cl. 414-563.000.
Vyas, Dolatrai M.; Saulnier, Mark G.; and Kadow, John F., to Bristol-Meyers Company. 3',4'-dinitrogen substituted epipodophyllotoxin glucoside derivatives. 4,874,851, Cl. 536-17.200.
W. C. Heraeus GmbH: *See*—
Ziegler, Horst; and Behlen, Horst, 4,874,252, Cl. 374-117.000.
W. L. Gore & Associates, Inc.: *See*—
Walter, Jeffrey A.; Garg, Kailash C.; and Rowan, Joseph C., 4,875,026, Cl. 333-251.000.
W. R. grace & Co.-Conn.: *See*—
Minhas, Bhupender S., 4,874,405, Cl. 55-158.000.
Wachspress, How. Free flying magnetic levitator. 4,874,346, Cl. 446-484.000.
Wachtel, Helmut: *See*—
Huth, Andreas; Sauer, Gerhard; and Wachtel, Helmut, 4,874,768, Cl. 514-288.000.
Wacker-Chemie GmbH: *See*—
Eck, Herbert; Fleischmann, Gerald; Prasse, Alfred; and Kolbig, Kunigunde, 4,874,638, Cl. 427-222.000.
Huhn, Karl, 4,874,662, Cl. 428-266.000.
Wada, Kiyoshi: *See*—
Miyauchi, Shizuya; and Wada, Kiyoshi, 4,875,141, Cl. 362-61.000.
Wada, Sumio: *See*—
Yasuda, Kazuhiko; and Wada, Sumio, 4,875,116, Cl. 360-78.110.
Wagatsuma, Yoshihiko: *See*—
Hongo, Akihito; Shiota, Tsuneo; Nishida, Shigeo; Miyagi, Mitsunobu; and Wagatsuma, Yoshihiko, 4,875,218, Cl. 372-64.000.
Wagener, Hans; and Zachrei, Jurgen, to Rittal-Werk Rudolf Loh GmbH & Co., KG. Adapter. 4,874,321, Cl. 439-119.000.
Waggoner, Marion G.: *See*—
Inskip, Harold K.; and Waggoner, Marion G., 4,874,817, Cl. 525-183.000.
Wahlenmeier, Fred E.: *See*—
Quisenberry, Tony M.; and Wahlenmeier, Fred E., 4,874,103, Cl. 220-1.001.
Waibel, Helmut K., to Xerox Corporation. Impact mechanism for impact printer. 4,874,265, Cl. 400-357.000.
Wainwright, Harry L. Fabric with illuminated changing display. 4,875,144, Cl. 362-103.000.
Wakabayashi, Ataru; Umehara, Yohichi; Morie, Satsuki; Kuwahara, Ikuro; and Okada, Yoshimi, to Chiyoda Corporation. Process for the preparation of redox battery electrolyte and recovery of lead chloride. 4,874,483, Cl. 204-94.000.
Wakabayashi, Makoto; Fujiwara, Kenichi; and Hayashi, Hideo, to Idemitsu Petrochemical Co., Ltd. Thermoplastic wholly aromatic polyimide esters and process for producing the same. 4,874,836, Cl. 528-185.000.
Wakabayashi, Tsuneo: *See*—
Ueda, Kouichiro; Tanaka, Satoru; Kunii, Toshinobu; Kagei, Kengo; Sato, Tadashi; Ono, Hideki; Ohtsuka, Issei; Kawase, Mayumi; Ohgoh, Toshiharu; and Wakabayashi, Tsuneo, 4,874,869, Cl. 548-309.000.
Wakahata, Yasuo: *See*—
Matsukawa, Hideki; Masuyama, Takeshi; Hirota, Minoru; Wakahata, Yasuo; Itoh, Masahiro; and Harada, Shinji, 4,874,227, Cl. 350-334.000.
Wakita, Saburo; and Hoshi, Junji, to Mitsubishi Kinzoku Kabushiki Kaisha. Wear-resistant intermetallic compound alloy having improved machineability. 4,874,577, Cl. 420-417.000.
Waldhelm, Christian M.: *See*—
Cang, John N.; Gast, Joseph R.; Hensley, John J.; and Waldhelm, Christian M., 4,874,290, Cl. 415-173.400.
Walk, Hansjorg, to Keiper Recaro GmbH & Company. Hinge joint for use in the seats of motor vehicles. 4,874,204, Cl. 297-362.000.
Walker, Raymond M.; Achor, Donald P.; Baumgarten, Robert W.; and Bogard, Ralph B., to United Technologies Corporation. Fabrication or repair technique for integrally bladed rotor assembly. 4,873,751, Cl. 29-156.80B.
Wallace, William D., to Utah Medical Products. Disposable apparatus for monitoring intrauterine pressure and fetal heart rate. 4,873,986, Cl. 128-670.000.
Wallner, Barbara P.; Pepinsky, R. Blake; and Garwin, Jeffrey L., to Biogen, Inc. DNA sequences, recombinant DNA molecules and processes for producing human phospholipase inhibitor-like polypeptides. 4,874,743, Cl. 514-12.000.
Walsh, David J.; Lougheed, William M.; Gentili, Fred; and Fazl, Mahmood, to Walsh Manufacturing (Mississauga) Limited. Anastomosis device and method. 4,873,975, Cl. 128-334.00R.
Walsh Manufacturing (Mississauga) Limited: *See*—
Walsh, David J.; Lougheed, William M.; Gentili, Fred; and Fazl, Mahmood, 4,873,975, Cl. 128-334.00R.
Walter, Jeffrey A.; Garg, Kailash C.; and Rowan, Joseph C., to W. L. Gore & Associates, Inc. Dielectric waveguide having higher order mode suppression. 4,875,026, Cl. 333-251.000.
Walters, Philip H.: *See*—
Roberts, George F.; and Walters, Philip H., 4,875,014, Cl. 324-326.000.
Wambach, Ludwig; and Fischer, Martin, to BASF Aktiengesellschaft. Preparation of substituted lactams. 4,874,865, Cl. 546-243.000.
Wang, Ted T. H. Toy bed. 4,873,733, Cl. 5-93.00R.
Ward, Billy W.; and Ward, Michael L., to Micrion Corporation. Focused ion beam imaging and process control. 4,874,947, Cl. 250-309.000.
Ward, Brooke A.: *See*—
Bransden, Antony S.; Megaw, John H. P. C.; Terry, Malcolm J.; and Ward, Brooke A., 4,874,919, Cl. 219-121.680.
Ward, Michael L.: *See*—
Ward, Billy W.; and Ward, Michael L., 4,874,947, Cl. 250-309.000.
Ward, Stanley H., to University of Utah Research Institute. Multi-array borehole resistivity and induced polarization method with mathematical inversion of redundant data. 4,875,015, Cl. 324-323.000.
Warner-Lambert Company: *See*—
Carethers, Mary E.; Centenko, Wiaczeslaw A.; Connor, David T.; Johnson, Elizabeth A.; Kiely, John S.; Schwender, Charles F.; Sircar, Jagadiah C.; Sorenson, Roderick J.; Unangst, Paul C.; and Bruns, Robert F., 4,874,758, Cl. 514-226.500.
Sircar, Jagadish C.; Brungardt, Catherine R.; and Schwender, Charles F., 4,874,862, Cl. 544-276.000.
Warning, Theodore A.: *See*—
Boze, Ronald A.; and Warning, Theodore A., 4,874,533, Cl. 210-778.000.
Warych, Hans, to Signode System GmbH. Edge protector and method of making same. 4,874,095, Cl. 206-586.000.
Washington University: *See*—
Covey, Douglas F.; and Auchus, Ricahrd J., 4,874,891, Cl. 560-256.000.
Washizuka, Isamu; Inoue, Yukihiro; and Okajima, Yoshio, to Sharp Kabushiki Kaisha. Liquid crystal display device for both inputting and outputting information. 4,875,036, Cl. 340-784.000.
Watanabe, Hideo; and Kurata, Yoshiaki, to Komori Printing Machinery Co., Ltd. Measurement position synchronization method for a scanning densitometer. 4,874,247, Cl. 356-402.000.
Watanabe, Kenichi, to Mazda Motor Corporation. Control in a vehicle four wheel steering system. 4,874,054, Cl. 180-140.000.
Watanabe, Michihiro: *See*—
Takagaki, Hidetsugu; Abe, Masayoshi; Watanabe, Michihiro; Takeuchi, Kazuyuki; Nakanishi, Shigenori; Nakata, Yuuko; and Yamazaki, Keiji, 4,874,855, Cl. 540-3.000.
Watanabe, Naohiro: *See*—
Sakai, Shunji; Kitagawa, Tohru; Suzuki, Kunikazu; and Watanabe, Naohiro, 4,875,099, Cl. 358-213.110.
Watanabe, Naoto; Tanaka, Akira; Matsumoto, Takayuki; Ohmura, Yutaka; and Kojima, Hisao, to Ishikawajima-Harima Heavy Industries Co., Ltd. Vessel lid mounting and demounting apparatus. 4,873,760, Cl. 29-714.000.
Watanabe, Toshio: *See*—
Sato, Masahiko; Konuma, Toshimitsu; Odaka, Seiichi; Yamaguchi, Toshiharu; Watanabe, Toshio; Aoyagi, Osamu; Tabata, Kaoru; Isigaki, Chizuru; Sakayori, Hiroyuki; Kobayashi, Ippei; Osabe, Akio; and Yamazaki, Shunpei, 4,874,461, Cl. 156-633.000.

Watanabe, Toshiyuki: *See—*
Yamanouchi, Junichi; Ono, Shigetoshi; Hirano, Tsumoru; Watanabe, Toshiyuki; Sakai, Nobuo; and Mihayashi, Keiji, 4,874,689, Cl. 430-548.000.

Watkins, Clinton E.; and Rowland, Bobby A., to Southwire Company. Method for applying strand filling compound. 4,874,442, Cl. 156-48.000.

Watts, Michael P. C.; Perera, Thiloma I.; Myers, David W.; Ozarski, Robert G.; Schipper, John F.; and Tan, Raul V., to Hoechst Celanese. Characterization of semiconductor resist material during processing. 4,874,240, Cl. 356-73.000.

Waukesha Rubber Company, Inc.: *See—*
Dewberry, Larry S.; and Schlipp, Richard H., 4,873,747, Cl. 17-11.10R.

Wayne State University: *See—*
Thomas, Robert L.; Kuo, Pao-Kuang; and Favro, Lawrence D., 4,874,251, Cl. 374-45.000.

Weber, Hans-Ulrich: *See—*
Haas, Peter; Sommerfeld, Claus-Dieter; and Weber, Hans-Ulrich, 4,874,797, Cl. 521-167.000.

Weber, James J.: *See—*
Kuphal, Jeffrey A.; Robeson, Lloyd M.; and Weber, James J., 4,874,030, Cl. 164-34.000.

Weber, Roland: *See—*
Leipold, Ludwig; Sander, Rainald; Tihanyi, Jenoe; and Weber, Roland, 4,875,131, Cl. 361-103.000.

Webster, David R. Pulp refining apparatus. 4,874,136, Cl. 241-251.000.

Webster, John A. Stereoscopic viewing system and method. 4,874,235, Cl. 351-201.000.

Wechsler, Lawrence I. Float for fluid measurements. 4,873,872, Cl. 73-861.570.

Wehnert, Wolfgang: *See—*
Dujardin, Ralf; Ebert, Wolfgang; Meyer, Rolf-Volker; Berg, Klaus; Grigo, Ulrich; and Wehnert, Wolfgang, 4,874,816, Cl. 525-146.000.

Weihrauch, Georg, to Coronet-Werke Heinrich Schlerf GmbH. Dispenser for pasty or flowable media. 4,874,115, Cl. 222-386.000.

Weil, George, to David R. Webb Co., Inc. Flitch washer. 4,874,003, Cl. 134-111.000.

Weimer, John R., to Pillsbury Company, The. Microwave food product and method of manufacture. 4,874,917, Cl. 219-10.55M.

Weiner, Murray: *See—*
Goodrich, Raymond P., Jr.; Williams, Christine M.; Franco, Robert S.; and Weiner, Murray, 4,874,690, Cl. 435-2.000.

Weissflog, Wolfgang: *See—*
Yong, Bak G.; Petra, Barth; Dietrich, Demus; Detlev, Joachimi; Kampa, Barbara; Kohler, Saskia; Mohr, Kristine; Paschke, Reinhard; Pelzl, Gerhard; Rosenfeld, Ulrich; Schafer, Wolfgang; Scherf, Klaus-Dieter; Tachirske, Carsten; Weissflog, Wolfgang; and Zaschke, Horst, 4,874,544, Cl. 252-299.610.

Wells, Thomas B.: *See—*
Harms, Frank M.; Tripp, Victor; and Wells, Thomas B., 4,874,915, Cl. 219-10.55F.

Welsch, Wolfgang: *See—*
Krueger, Hans; and Welsch, Wolfgang, 4,875,220, Cl. 372-107.000.

Werner, Eberhard, to Eumuco Aktiengesellschaft Fur Maschinenbau. Lifting beam assembly for a forming press. 4,873,860, Cl. 72-405.000.

Werner, Walter M., to AMP Incorporated. Method of making an electrical connector. 4,873,765, Cl. 29-876.000.

Wesdock, James F.: *See—*
McMeekin, James H.; Lerch, Alan E.; Chollock, Ronald S.; and Wesdock, James F., 4,874,940, Cl. 250-223.00B.

West, Kenneth W.: *See—*
Pfeiffer, Loren N.; and West, Kenneth W., 4,873,833, Cl. 62-55.500.

Westerberg, Roger K.: *See—*
Jacobson, Richard L.; Jeffrey, Frank R.; and Westerberg, Roger K., 4,874,631, Cl. 427-39.000.

Westinghouse Electric Corp.: *See—*
Andersen, James K.; and Hikes, Carl L., 4,874,324, Cl. 439-271.000.
Boundy, Bruce K.; and Schoumaker, Raoul J. P., 4,874,027, Cl. 160-230.000.
Gisoni, Gregory A.; and Forker, James M., 4,875,043, Cl. 341-22.000.
McLaughlin, David F.; and Stoltz, Richard A., 4,874,475, Cl. 203-51.000.
Reichner, Philip, 4,874,678, Cl. 429-30.000.

Wetco of Delaware, Inc.: *See—*
Casey Jr., Walter P., 4,874,514, Cl. 210-321.870.

Whetstone, James H. Wallcovering substrate formed of textured, continuous, multi-filament yarns having hydrophilic characteristics. 4,874,019, Cl. 139-420.00A.

Whiffin, Peter A. C.: *See—*
Easton, Brian C.; and Whiffin, Peter A. C., 4,874,634, Cl. 427-54.100.

White, Charles R., to General Motors Corporation. Viscous clutch for engine cooling fan. 4,874,071, Cl. 192-58.00B.

White, Frederick R.; and Bolles, Roy E. Power infuser. 4,874,359, Cl. 604-4.000.

Whitehead Engineered Products, Inc.: *See—*
Bucci, George H., 4,874,020, Cl. 141-59.000.

Whitlock, David R. Separating constituents of a mixture of particles. 4,874,507, Cl. 209-11.000.

Whittaker Corporation: *See—*
Iverson, Ralph, 4,874,331, Cl. 439-449.000.

Wicher, Jerome: *See—*
Baron, Arthur L.; Myers, Terry N.; and Wicher, Jerome, 4,874,803, Cl. 524-94.000.

Wichterle, Otto, to Ceskoslovenska akademie ved. Toric contact lens with displaced center of gravity. 4,874,234, Cl. 351-161.000.

Wickstead, James C.: *See—*
Heidt, Thomas; and Wickstead, James C., 4,875,107, Cl. 360-9.100.

Wiemann, Michael C.: *See—*
Calabresi, Paul; Wiemann, Michael C.; and Chu, Ming Y. W., 4,874,602, Cl. 424-10.000.

Wiens, Thomas J. Solid waste processing facility and process. 4,874,134, Cl. 241-19.000.

Wiest, Peter P.; and Fuchs, Hubert. Method and device for insufflating gas. 4,874,362, Cl. 604-26.000.

Wiggins Teape Group Limited, The: *See—*
Bransden, Antony S.; Megaw, John H. P. C.; Terry, Malcolm J.; and Ward, Brooke A., 4,874,919, Cl. 219-121.680.

Wilcox, Donald E.: *See—*
Smith, Leroy H., Jr.; and Wilcox, Donald E., 4,874,289, Cl. 415-150.000.

Wilfreid Pavel Machinenbau: *See—*
Pavel, Wilfried, 4,873,812, Cl. 53-241.000.

Wilkerson, Alan W.: *See—*
Linke, Thomas A.; Dandan, Issa R.; Livingston, Troy W.; and Wilkerson, Alan W., 4,873,792, Cl. 51-165.800.

William H. Takahashi: *See—*
Canonge, Sidney J., 4,873,773, Cl. 34-90.000.

Williams, Christine M.: *See—*
Goodrich, Raymond P., Jr.; Williams, Christine M.; Franco, Robert S.; and Weiner, Murray, 4,874,690, Cl. 435-2.000.

Williams, K. Barry A., to Foxboro Company, The. Method of making a multilayer electrical coil. 4,873,757, Cl. 29-602.100.

Williams, Michael K.: *See—*
Dawson, Geoffrey G.; and Williams, Michael K., 4,874,538, Cl. 252-117.000.

Williams, Sam. Device for unlocking car doors. 4,873,897, Cl. 81-15.900.

Williamson, Anthony R. Steam power plant. 4,873,829, Cl. 60-670.000.

Williamson, Robert M. Adjustable bed system. 4,873,731, Cl. 5-68.000.

Williamson, Ronald E., to Orange Water & Sewer Authority. Process for treating wastewater. 4,874,519, Cl. 210-605.000.

Willis, Robin L., Jr.: *See—*
Lee, Chi-Long; and Willis, Robin L., Jr., 4,874,667, Cl. 428-402.220.

Wilmotte, Stephan, to Centre de Recherches Metallurgiques–Centrum Voor Research in de Metallurgie. Device for casting a metal in the pasty phase. 4,874,471, Cl. 164-437.000.

Wilperath, Peter: *See—*
Hager, Jorg; Ghyczy, Miklos; Feyen, Vincent; Imberge, Paul; Brandenburg, Ulrich; and Wilperath, Peter, 4,874,553, Cl. 260-403.000.

Wilson, Kenneth: *See—*
Joannou, Kyriacos; Wilson, Kenneth; and Lowry, Alan B., 4,875,125, Cl. 360-128.000.

Wilson, Raymond L.: *See—*
Luttmer, David J.; Panian, Thomas L.; Wixey, Barry D.; and Wilson, Raymond L., 4,873,770, Cl. 33-706.000.

Wilson, Timothy C.: *See—*
Atlas, George N.; Donnally, Leroy C.; Urban, Donald P.; Perkins, James M.; and Wilson, Timothy C., 4,874,308, Cl. 425-544.000.

Wilson, Wilfred W.; Polemenakos, Sotiros C.; Potter, J. Larry; Mangold, Donald J.; Harlowe, William W.; and Schlameus, Herman W., to Dow Chemical Company, The. Microencapsulated ant bait. 4,874,611, Cl. 424-410.000.

Windmoller & Holscher: *See—*
Tetenborg, Konrad; Eschmann, Heinz; and Huwelmann, Helmut, 4,873,815, Cl. 53-570.000.

Winfield Corporation: *See—*
Quisenberry, Tony M.; and Wahlenmeier, Fred E., 4,874,103, Cl. 220-1.00T.

Winter, Robert W. Tool pack apparatus. 4,874,119, Cl. 224-202.000.

Winterburn, John A., to Thermal Syndicate P.L.C. Method of purifying vitreous silica. 4,874,417, Cl. 65-111.000.

Winters, R. Edward, to Advanced Biomedical Devices, Inc. Steerable guidewire for vascular system. 4,873,983, Cl. 128-657.000.

Winters, William L. Method and apparatus for sealing and protecting loading dock doorways. 4,873,801, Cl. 52-173.0DS.

Winterson, Warren D.: *See—*
Tamol, Ronald A.; Nepomuceno, Jose G.; Keritsis, Gus D.; Burnett, George H.; Thesing, Richard A.; Winterson, Warren D.; and Nichols, Walter A., 4,874,000, Cl. 131-375.000.

Wisconsin Alumni Research Foundation: *See—*
Durbin, Richard D.; Lukens, Jean H.; Uchytil, Thomas F.; and Rhodehamel, Nicholas, 4,874,706, Cl. 435-253.300.

Wishon, Berhl E.: *See—*
Kleeb, Thomas R.; and Wishon, Berhl E., 4,874,726, Cl. 501-124.000.

Wissel, Herbert L.: *See—*
Kriech, Anthony J.; and Wissel, Herbert L., 4,874,432, Cl. 106-273.100.

Witanachchi, Sarath: *See—*
Shaw, David T.; Witanachchi, Sarath; and Kwok, Hoi-Sing, 4,874,741, Cl. 505-1.000.

Witdoek, Daniel C.: *See—*
Snauwaert, Paul E. M.; Vergote, Geert R. J.; and Witdoek, Daniel C., 4,874,411, Cl. 55-290.000.

Witecki, Frank J. Pusher unit. 4,873,929, Cl. 104-172.300.

Wixey, Barry D.: *See*—
Luttmer, David J.; Panian, Thomas L.; Wixey, Barry D.; and Wilson, Raymond L., 4,873,770, Cl. 33-706.000.

Wolf, Alfred P.: *See*—
McPherson, Daniel W.; Fowler, Joanna S.; and Wolf, Alfred P., 4,874,600, Cl. 424-1.100.

Wolf, Thomas: *See*—
Kappeler, Franz; Wolf, Thomas; and Stegmueller, Bernhard, 4,875,217, Cl. 372-50.000.

Wondergem, Jan, to Multinorm B.V. Device for distributing a granular or powdery substance. 4,874,130, Cl. 239-63.000.

Wong, Patrick S. L.; Theeuwes, Felix; and Eckenhoff, James B., to ALZA Corporation. Multi-layer delivery system. 4,874,388, Cl. 604-891.100.

Wood, Ian A.; and Horsfield, Edward A., to English Electric Company Limited, The. Lid arrangement. 4,874,573, Cl. 376-272.000.

Wood, Robert S.: *See*—
Hallden-Abberton, Michael P.; Cohen, Leslie A.; and Wood, Robert S., 4,874,824, Cl. 525-379.000.

Woodruff, H. Boyd: *See*—
Huang, Leeyuan; Koupal, Lawrence; Dunn, Joseph, Jr.; Liesch, Jerrold M.; Hensens, Otto; and Woodruff, H. Boyd, 4,874,745, Cl. 514-18.000.

Woolard, Frank X., to ICI Americas Inc. 1-Phenyl-3-carboxyamidopyrrolidones and their use as herbicides. 4,874,422, Cl. 71-95.000.

Woolard, Frank X., to ICI Americas Inc. Process for the preparation of 3-acylpyrrolidones. 4,874,873, Cl. 548-540.000.

Worley, Shelby D., to PPG Industries, Inc. Method for decontamination of toxic chemical agents. 4,874,532, Cl. 210-755.000.

Worrall, Dayer. Vehicle window screen assembly. 4,874,026, Cl. 160-23.100.

Wright, Robert L., to Creative Athletic Products and Services, Inc. Ball catching trainer. 4,874,168, Cl. 273-26.00C.

Wright, Susan E.: *See*—
Paukovits, Edward J., Jr.; and Wright, Susan E., 4,874,337, Cl. 439-609.000.

Wroblewski, Lucien J. Conveyor. 4,874,080, Cl. 198-463.600.

Wroblowsky, Heinz-Jurgen; Kluth, Joachim; Tietjen, Klaus-Gunther; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, to Bayer Aktiengesellschaft. Herbicidal substituted triazines. 4,874,420, Cl. 71-93.000.

Wu, Lung-chi, to Campbell Soup Company. Substrate for growing shiitake mushrooms. 4,874,419, Cl. 71-5.000.

Wu, Wan C.: *See*—
Schwier, Chris E.; and Wu, Wan C., 4,874,829, Cl. 526-262.000.

Wu, Yao-Yu. Motor with an auto output adjusting device. 4,874,974, Cl. 310-112.000.

Wulms, Christiaan J. G. H.: *See*—
van der Eijk, Bart; van de Wiel, Johannes N.; Rongen, Engelbertus; and Wulms, Christiaan J. G. H., 4,874,987, Cl. 313-525.000.

Wunsch, Wolfgang: *See*—
Frenzel, Bertram; Grenzendorfer, Dietmar; Kemter, Heinz; Wunsch, Wolfgang; and Zeisberg, Peter, 4,873,844, Cl. 66-84.00A.

Wust, Robert, to Schnyder & Cie. Slide gauge. 4,873,771, Cl. 33-802.000.

Wykstra, Curt A.: *See*—
Butterfield, Roger P.; Neumann, Guenter J.; and Wykstra, Curt A., 4,873,879, Cl. 74-689.000.

Xerox Corporation: *See*—
Goffe, William L.; and Schram, Joseph G., 4,875,081, Cl. 355-303.000.
Pawlik, Robert S.; and Rasch, Kenneth R., 4,875,068, Cl. 355-286.000.
Sampath, Barbara A.; and Schenk, Richard C., 4,874,958, Cl. 355-309.000.
Thornton, Robert L.; and Burnham, Robert D., 4,875,216, Cl. 372-45.000.
Waibel, Helmut K., 4,874,265, Cl. 400-357.000.

Xicor, Inc.: *See*—
Deane, Peter, 4,874,967, Cl. 307-296.800.

Yabusaki, Masao: *See*—
Murakami, Yoshiki; Yamamoto, Etsuji; Yabusaki, Masao; and Kohno, Hideki, 4,875,013, Cl. 324-318.000.
Yokosawa, Koichi; Yamamoto, Etsuji; Nakane, Hideaki; Yabusaki, Masao; and Ogura, Yukiko, 4,875,010, Cl. 324-248.000.

Yagisita, Takahiro: *See*—
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.

Yaguchi, Akio; and Kyoo, Takatsugu, to Tsubakimoto Chain Co. Device for transferring a lithographic plate. 4,874,077, Cl. 198-408.000.

Yale University: *See*—
Crabtree, Robert H.; and Brown, Stephen H., 4,874,488, Cl. 204-157.150.

Yamada, Hidetoshi; and Nagasaki, Tatsuo, to Olympus Optical Co., Ltd. Field sequential color imaging apparatus. 4,875,091, Cl. 358-42.000.

Yamada, Ichiji; Inuzuka, Yutake; Ichihara, Isao; Murakami, Michiyuki; Suzuki, George; Yanahashi, Ryou; and Kondo, Takeshi, to Toyota Jidosha Kabushi Kaisha; and Tsuda Industries, Co., Ltd. Apparatus for supporting shift lever for transmission. 4,873,884, Cl. 74-473.00P.

Yamada, Kiichiro, to Kubota Ltd. Partially liquid-cooled type forced air-cooling system for internal combustion engine. 4,873,944, Cl. 123-41.570.

Yamada, Shin-ichi; Goto, Takao; Mashiko, Toshihisa; Kogi, Kentaro; Oguchi, Yukiko; and Narita, Senichi, to Toa Eiyo, Ltd. 4,7-dihydroisothiazolo(5,4-b)pyridine derivatives and cardiovascular treating agents containing said derivatives. 4,874,760, Cl. 514-234.200.

Yamagata, Masakazu, to Asahi Kogaku Kogyo Kabushiki Kaisha. Viewing optical system for use with endoscope. 4,874,220, Cl. 350-96.260.

Yamagishi, Takashi: *See*—
Kaite, Yoshikazu; and Yamagishi, Takashi, 4,874,414, Cl. 65-20.130.

Yamaguchi, Toshiharu: *See*—
Sato, Masahiko; Konuma, Toshimitsu; Odaka, Seiichi; Yamaguchi, Toshiharu; Watanabe, Toshio; Aoyagi, Osamu; Tabata, Kaoru; Isigaki, Chizuru; Sakayori, Hiroyuki; Kobayashi, Ippei; Osabe, Akio; and Yamazaki, Shunpei, 4,874,461, Cl. 156-633.000.

Yamaha Corporation: *See*—
Kurosaki, Makoto, 4,873,910, Cl. 84-422.100.
Murakami, Kazuo; Kaneko, Yasutoshi; and Tamaki, Takasi, 4,873,905, Cl. 84-20.000.
Norimatsu, Takashi, 4,873,904, Cl. 84-722.000.

Yamakawa, Takeshi, to Omron Tateisi Electronics Co. Fuzzy logic computers and circuits. 4,875,184, Cl. 364-807.000.

Yamaki, Takanori: *See*—
Idenawa, Hiroyuki; Mochimaru, Hideaki; Kanda, Hajime; Makita, Nobuhiro; Tanaka, Yoshiaki; Yagisita, Takahiro; Yamaki, Takanori; Motohashi, Takeshi; Miyamoto, Masayoshi; Ishizu, Hisao; Sagawa, Yasuhiro; Kanno, Tadaaki; Sankoda, Tomoo; Hosokawa, Hiroshi; Aoki, Hideo; Suzuki, Takami; Takada, Hiromi; and Shimazaki, Toshio, 4,875,063, Cl. 346-160.100.

Yamamoto, Eri: *See*—
Higuchi, Ryoichi; Sakurai, Takao; Yokota, Tadahiko; Mikami, Naoko; Yamamoto, Eri; and Takeuchi, Koji, 4,874,542, Cl. 252-299.610.

Yamamoto, Etsuji: *See*—
Murakami, Yoshiki; Yamamoto, Etsuji; Yabusaki, Masao; and Kohno, Hideki, 4,875,013, Cl. 324-318.000.
Yokosawa, Koichi; Yamamoto, Etsuji; Nakane, Hideaki; Yabusaki, Masao; and Ogura, Yukiko, 4,875,010, Cl. 324-248.000.

Yamamoto, Isamu; and Asaida, Takashi, to Sony Corporation. Output signal processing circuit for CCD register. 4,875,098, Cl. 358-213.160.

Yamamoto, Kazushi, to Sharp Kabushiki Kaisha. Paper cartridge with paper aligning means. 4,874,160, Cl. 271-227.000.

Yamamoto, Kenji: *See*—
Sasaki, Saburo; Ishida, Tsutomu; and Yamamoto, Kenji, 4,874,957, Cl. 250-578.000.

Yamamoto, Masahiro: *See*—
Nakagawa, Yoshitomo; Kaito, Takashi; Houjyo, Hisao; and Yamamoto, Masahiro, 4,874,632, Cl. 427-41.000.

Yamamoto, Mikio: *See*—
Maeno, Mikihiko; Ohta, Yukio; Momiyama, Yoshiharu; Ono, Hisao; Takahata, Katsumasa; Ozono, Kazuyuki; Shimizu, Makoto; and Yamamoto, Mikio, 4,874,159, Cl. 271-171.000.

Yamamoto, Shinobu; Okada, Kunihiro; Ohi, Satoshi; Oyama, Shiro; and Takei, Yasuharu, to Sumitomo Chemical Company, Limited. Insecticidal article for electric fumigator. 4,874,787, Cl. 514-531.125.

Yamamoto, Shinobu; Hoshide, Fumitoshi; Takeuchi, Michikazu; Kotani, Shou; and Yasuda, Sumihiro, to TDK Corporation. PTC heating device. 4,874,924, Cl. 219-274.000.

Yamamoto, Shosaku; Kakinuma, Kazuo; Ishioka, Hiroshi; Sodeyama, Fumio; Mayumi, Junji; and Maruta, Riichiro, to Nippon Oil and Fats Co., Ltd. Primer compositions. 4,874,818, Cl. 525-183.000.

Yamamoto, Soichiro, to Fuji Photo Film Co., Ltd. Light-sensitive material containing silver halide, reducing agent and polymerizable compound in microcapsules separately sensitized. 4,874,684, Cl. 430-138.000.

Yamamoto, Takashi: *See*—
Ohya, Kanji; Tsunooka, Tsutomu; Ogura, Koji; Ozeki, Hirofumi; and Yamamoto, Takashi, 4,874,727, Cl. 501-134.000.

Yamamoto, Takeshi, to Mazda Motor Corporation. Power-driven cowl for an automotive vehicle. 4,874,199, Cl. 296-192.000.

Yamamura, Hirohisa: *See*—
Kimura, Hiroshi; Naito, Shotaro; Miyashita, Kunio; Noto, Yasuo; Sugiura, Noboru; Takahashi, Tadashi; Yamamura, Hirohisa; Yamashita, Seizi; Kawamata, Syooichi; Tajima, Fumio; and Horikoshi, Shigeru, 4,874,053, Cl. 180-79.100.

Yamane, Hisaaki; and Hirose, Noboru, to Brother Kogyo Kabushiki Kaisha. Machine tool. 4,873,756, Cl. 29-568.000.

Yamane, Takakazu: *See*—
Matsui, Masataka; Aono, Toshiaki; Tanimoto, Yoshio; Nakahama, Tadamitsu; and Yamane, Takakazu, 4,874,639, Cl. 427-240.000.

Yamanishi, Eiichi; Abuyama, Yasuo; and Someya, Akihiko, to Kabushiki Kaisha Toshiba. Image forming apparatus with positioning-mark forming function. 4,875,092, Cl. 358-75.000.

Yamanouchi, Junichi; Ono, Shigetoshi; Hirano, Tsumoru; Watanabe, Toshiyuki; Sakai, Nobuo; and Mihayashi, Keiji, to Fuji Photo Film Co., Ltd. Silver halide color photographic material. 4,874,689, Cl. 430-548.000.

Yamaoka, Takehiro: *See*—
Nakagawa, Yoshitomo; and Yamaoka, Takehiro, 4,874,460, Cl. 156-626.000.

Yamashita, Seizi: *See*—
Kimura, Hiroshi; Naito, Shotaro; Miyashita, Kunio; Noto, Yasuo; Sugiura, Noboru; Takahashi, Tadashi; Yamamura, Hirohisa;

Yamashita, Seizi; Kawamata, Syooichi; Tajima, Fumio; and Horikoshi, Shigeru, 4,874,053, Cl. 180-79.100.
Yamashita, Shinichi: *See*—
Shimokoriyama, Makoto; Yamashita, Shinichi; Abe, Naoto; Kashida, Motokazu; Takei, Masahiro; and Takahashi, Koji, 4,875,090, Cl. 358-12.000.
Yamato Scale Company, Limited: *See*—
Kawanishi, Shozo; and Higuchi, Tadashi, 4,874,048, Cl. 177-25.180.
Yamazaki, Hiroshi: *See*—
Miya, Shinya; Harada, Masato; Mise, Takaya; and Yamazaki, Hiroshi, 4,874,880, Cl. 556-53.000.
Yamazaki, Keiji: *See*—
Takagaki, Hidetsugu; Abe, Masayoshi; Watanabe, Michihiro; Takeuchi, Kazuyuki; Nakanishi, Shigenori; Nakata, Yuuko; and Yamazaki, Keiji, 4,874,855, Cl. 540-3.000.
Yamazaki, Masanobu: *See*—
Matsuoka, Ken; and Yamazaki, Masanobu, 4,874,353, Cl. 474-168.000.
Yamazaki, Shunpei; Itoh, Kenji; and Nagayama, Susumu, to Semiconductor Energy Laboratory Co., Ltd. Electronic device manufacturing methods. 4,874,920, Cl. 219-121.850.
Yamazaki, Shunpei: *See*—
Sato, Masahiko; Konuma, Toshimitsu; Odaka, Seiichi; Yamaguchi, Toshiharu; Watanabe, Toshio; Aoyagi, Osamu; Tabata, Kaoru; Isigaki, Chizuru; Sakayori, Hiroyuki; Kobayashi, Ippei; Osabe, Akio; and Yamazaki, Shunpei, 4,874,461, Cl. 156-633.000.
Yamomoto, Hiroshi; Yoshida, Shigeru; and Yoshida, Katumi, to Canon Kabushiki Kaisha; and Canon Denshi Kabushiki Kaisha. Diaphragm control device for interchangeable lens. 4,874,233, Cl. 350-429.000.
Yanagida, Kouichi; Kano, Shinichiro; Gotou, Takeshi; and Hirose, Takashi, to Kojima Press Industry Co., Ltd. Muffler. 4,874,062, Cl. 181-250.000.
Yanahashi, Ryou: *See*—
Yamada, Ichiji; Inuzuka, Yutake; Ichihara, Isao; Murakami, Michiyuki; Suzuki, George; Yanahashi, Ryou; and Kondo, Takeshi, 4,873,884, Cl. 74-473.00P.
Yanai, Genzo: *See*—
Matsushita, Takashi; and Yanai, Genzo, 4,874,973, Cl. 310-78.000.
Yang, Chen-Shi. Vacuum frying and oil separating device. 4,873,920, Cl. 99-409.000.
Yaoka, Osamu: *See*—
Tahara, Tetsuya; Ikebe, Tsuguo; Hakamada, Ichiro; and Yaoka, Osamu, 4,874,759, Cl. 514-232.500.
Yarbro, Mark D.: *See*—
Sorensen, James L.; Yarbro, Mark D.; and Glockner, Charles A., 4,874,534, Cl. 210-803.000.
Yason S.r.l.: *See*—
Quadro, Giuseppe, 4,874,776, Cl. 514-365.000.
Yasuda, Kazuhiko; and Wada, Sumio, to Teac Corporation. Transducer position control system for data transfer apparatus employing disklike record media. 4,875,116, Cl. 360-78.110.
Yasuda, Nozomi: *See*—
Maruzeni, Shoji; Matsumoto, Wataru; and Yasuda, Nozomi, 4,874,699, Cl. 435-135.000.
Yasuda, Sumihiro: *See*—
Yamamoto, Shinobu; Hoshide, Fumitoshi; Takeuchi, Michikazu; Kotani, Shou; and Yasuda, Sumihiro, 4,874,924, Cl. 219-274.000.
Yatsu, Tadao; and Akana, Yoshinori, to Mitsui Petrochemical Industries, Inc. Polyester composition, molded polyester laminate and use thereof. 4,874,647, Cl. 428-35.700.
Yen, Larry Y.: *See*—
Lopatin, George; Yen, Larry Y.; and Rogers, Randall R., 4,874,567, Cl. 264-45.100.
Yesair, David W. Composition for delivery of orally administered drugs and other substances. 4,874,795, Cl. 514-725.000.
Ying, Lincoln: *See*—
McMahon, Paul; Chung, Tai-Shung; and Ying, Lincoln, 4,874,563, Cl. 264-29.200.
Yngve, Paul W.: *See*—
Hallam, Donald E.; Popper, Peter; Staunton, Harold F.; Taylor, Robert E.; and Yngve, Paul W., 4,873,821, Cl. 57-293.000.
Yoda, Akira: *See*—
Kimura, Akinori; and Yoda, Akira, 4,875,080, Cl. 355-246.000.
Yokohama Rubber Co., Ltd., The: *See*—
Hattori, Yutaka, 4,875,070, Cl. 355-299.000.
Yokoi, Takeshi; and Nakamura, Shigeo, to Brother Kogyo Kabushiki Kaisha. Printer having pivotable ribbon guide. 4,874,262, Cl. 400-216.100.
Yokokawa, Kiyoshi; and Koya, Kazuo, to Shin-Etsu Chemical Co., Ltd. Base material of optical fibers and a method for the preparation thereof. 4,874,416, Cl. 65-3.120.
Yokosawa, Koichi; Yamamoto, Etsuji; Nakane, Hideaki; Yabusaki, Masao; and Ogura, Yukiko, to Hitachi, Ltd. Circuit for detecting AC magnetic field due to magnetic resonance with a variable resistance for noise suppression. 4,875,010, Cl. 324-248.000.
Yokosawa, Seiichi, to Pioneer Electronic Corporation. Digital signal tape recording/reproducing apparatus with improved servo control. 4,875,115, Cl. 360-77.150.
Yokota, Tadahiko: *See*—
Higuchi, Ryoichi; Sakurai, Takao; Yokota, Tadahiko; Mikami, Naoko; Yamamoto, Eri; and Takeuchi, Koji, 4,874,542, Cl. 252-299.610.
Yokoyama, Junichi: *See*—
Muranaka, Shigeo; Ohkawa, Kouzaburou; Yokoyama, Junichi; Matayoshi, Yutaka; and Kamegaya, Shigeru, 4,873,953, Cl. 123-308.000.
Yokoyama, Tetsuo: *See*—
Maeda, Akira; Sano, Koichi; Yokoyama, Tetsuo; Koizumi, Hideaki; and Mizuno, Hirotaka, 4,875,012, Cl. 324-309.000.
Yoneda, Takao: *See*—
Asano, Hiroaki; Tsujiuchi, Toshio; Yoneda, Takao; Ishihara, Nobuhiro; Maruyama, Toshio; and Ohta, Norio, 4,873,793, Cl. 51-165.710.
Yoneda, Yasuji: *See*—
Nishimoto, Yoshiro; Yoneda, Yasuji; Imaoka, Shinichi; Nakai, Yasuhide; Nakaue, Akimitsu; Onishi, Yoshihiko; Tachibana, Hiroyuki; Inoue, Takayoshi; Kusaka, Takuya; Takamatsu, Hiroyuki; Tojyo, Shigeki; Kajikawa, Hiroshi; and Nishimura, Kozo, 4,874,939, Cl. 250-211.00J.
Yonemoto, Kazuya; Kagawa, Yoshiaki; Ishikawa, Kikue; Suzuki, Tomoyuki; and Hamasaki, Masaharu, to Sony Corporation. Electronic shutter for a CCD image sensor. 4,875,100, Cl. 358-213.190.
Yonezawa, Eiichi: *See*—
Ohsawa, Masahiro; and Yonezawa, Eiichi, 4,874,976, Cl. 310-268.000.
Yong, Bak G.; Petra, Barth; Dietrich, Demus; Detlev, Joachimi; Kampa, Barbara; Kohler, Saskia; Mohr, Kristine; Paschke, Reinhard; Pelzl, Gerhard; Rosenfeld, Ulrich; Schafer, Wolfgang; Scherf, Klaus-Dieter; Tschirske, Carsten; Weissflog, Wolfgang; and Zaschke, Horst, to VEB Werk fuer Fernsehelektronik im VEB Kombinat Mikroelektronik. Ferroelectric liquid crystals. 4,874,544, Cl. 252-299.610.
Yoo, Hideo: *See*—
Bisaiji, Takashi; Sawayama, Noboru; and Yoo, Hideo, 4,875,079, Cl. 355-246.000.
Yoshida, Hidemi: *See*—
Hase, Takashi; and Yoshida, Hidemi, 4,874,985, Cl. 313-487.000.
Yoshida, Katumi: *See*—
Yamomoto, Hiroshi; Yoshida, Shigeru; and Yoshida, Katumi, 4,874,233, Cl. 350-429.000.
Yoshida Kogyo K. K.: *See*—
Kasai, Tomoaki; and Sekiguchi, Seizo, 4,873,847, Cl. 68-178.000.
Yoshida, Naoyuki; Kitano, Kisei; and Ogawa, Tetsuya, to Chisso Corporation. Phenylpyrimidinecarboxylate derivative. 4,874,546, Cl. 252-299.610.
Yoshida, Shigeru: *See*—
Yamomoto, Hiroshi; Yoshida, Shigeru; and Yoshida, Katumi, 4,874,233, Cl. 350-429.000.
Yoshida, Tetsushi, to Casio Computer Co., Ltd. Liquid crystal composition. 4,874,543, Cl. 252-299.610.
Yoshida, Tomoaki: *See*—
Tanagawa, Kouji; and Yoshida, Tomoaki, 4,875,156, Cl. 364-200.000.
Yoshida, Yasuharu, to NEC Corporation. Automatic level control circuit for an ad convertor. 4,875,049, Cl. 341-159.000.
Yoshie, Yasumasa: *See*—
Kobayashi, Setsuo; Nakazawa, Tsugio; Yoshie, Yasumasa; Abiko, Yasushi; and Kameda, Kinya, 4,874,772, Cl. 514-341.000.
Yoshikawa, Masao: *See*—
Suzuki, Tetsuro; Yoshikawa, Masao; and Kojima, Akio, 4,874,481, Cl. 204-59.00R.
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, to Kureha Kagaku Kogyo Kabushiki Kaisha. Pharmaceutical composition containing a derivative of para-aminobenzoic acid as an active ingredient. 4,874,750, Cl. 514-42.000.
Yoshimoto, Yuichiro: *See*—
Igarashi, Takao; Sugawara, Satoshi; Yoshimoto, Yuichiro; Saito, Shozo; Fukumoto, Takashi; Endo, Zenichiro; and Shinbo, Katsutoshi, 4,874,574, Cl. 376-333.000.
Yoshitomi Pharmaceutical Industries, Ltd.: *See*—
Tahara, Tetsuya; Ikebe, Tsuguo; Hakamada, Ichiro; and Yaoka, Osamu, 4,874,759, Cl. 514-232.500.
Yotsutani, Akio: *See*—
Hara, Toshihiro; Yotsutani, Akio; Kawasaki, Ryoji; Tate, Kazuyuki; Huse, Syoji; and Ono, Koji, 4,875,231, Cl. 379-61.000.
Young, Lawrence R.: *See*—
McCann, James D.; Young, Lawrence R.; and Brandon, John M., 4,875,055, Cl. 346-75.000.
Younger, Thomas L., to Data Card Coprporation. Smart card apparatus and method of programming same. 4,874,935, Cl. 235-492.000.
Youssefyeh, Raymond; Chakraborty, Utpal; Magnien, Ernest; Desai, Rohit; and Lee, Thomas D-Y, to Rorer Pharmaceutical Corporation. Quinolinyl ether or thioether tetrazoles as agents for the treatment of hypersensitive ailments. 4,874,769, Cl. 514-314.000.
Yu, Kuang-Shih. Socket assembly. 4,874,329, Cl. 439-409.000.
Yuen, Raymond C.: *See*—
Coy, Bruce H.; and Yuen, Raymond C., 4,874,970, Cl. 307-475.000.
Yueng, Edward S.: *See*—
Synovec, Robert E.; and Yueng, Edward S., 4,875,169, Cl. 364-497.000.
Yukimoto, Koji: *See*—
Kobayashi, Osamu; Yukimoto, Koji; and Mikami, Mitsugu, 4,874,347, Cl. 453-5.000.
Yurchenco, James R.: *See*—
Groswith III, Charles T.; Seipp III, Edwin A.; Sun, Rickson; and Yurchenco, James R., 4,874,186, Cl. 281-28.000.
Yurtin, John A.: *See*—
Bensing, Gregory L.; Gladd, Joseph H.; and Yurtin, John A., 4,874,325, Cl. 439-272.000.
Zachrei, Jurgen: *See*—
Wagener, Hans; and Zachrei, Jurgen, 4,874,321, Cl. 439-119.000.

Zallie, James P.: *See*—
Eden, James L.; Kasica, James J.; and Zallie, James P., 4,874,628, Cl. 426-578.000.
Zalut, Gregory J. Tamper evident cap. 4,874,101, Cl. 215-251.000.
Zart, Robert C.: *See*—
Stierman, Roger J.; McCauley, Archie N.; and Zart, Robert C., 4,874,476, Cl. 204-15.000.
Zaschke, Horst: *See*—
Yong, Bak G.; Petra, Barth; Dietrich, Demus; Detlev, Joachimi; Kampa, Barbara; Kohler, Saskia; Mohr, Kristine; Paschke, Reinhard; Pelzl, Gerhard; Rosenfeld, Ulrich; Schafer, Wolfgang; Scherf, Klaus-Dieter; Tschirske, Carsten; Weissflog, Wolfgang; and Zaschke, Horst, 4,874,544, Cl. 252-299.610.
Zazzetta, Alessandro: *See*—
Agostinis, Enrico; Castro, Sergio; and Zazzetta, Alessandro, 4,874,821, Cl. 525-271.000.
Zdeb, Brian; Pearson, Steve; and Slater, Glenn L., to Baxter International Inc. Housing enabling passive mixing of a beneficial agent with a diluent. 4,874,366, Cl. 604-56.000.
Zech, Ronald G., to Ektelon. String clamp for racquet stringing machine. 4,874,170, Cl. 273-73.00A.
Zeisberg, Peter: *See*—
Frenzel, Bertram; Grenzendorfer, Dietmar; Kemter, Heinz; Wunsch, Wolfgang; and Zeisberg, Peter, 4,873,844, Cl. 66-84.00A.
Zeman, Gerhard: *See*—
Bankhamer, Vinzenz; and Zeman, Gerhard, 4,874,441, Cl. 149-42.000.
Zenith Electronics Corporation: *See*—
Grimm, Frank W., 4,873,764, Cl. 29-830.000.
Zhang, Zhi-Dong: *See*—
Fife, Wilmer K.; and Zhang, Zhi-Dong, 4,874,558, Cl. 562-894.000.
Zhitnikov, Valery K.: *See*—
Dzjuban, Vitaly S.; Sazhin, Alexandr D.; Zhitnikov, Valery K.; and Konoplyanko, Anatoly I., 4,875,040, Cl. 340-825.060.
Ziauddin, Habeeb M.: *See*—
Matthews, Bernard T.; Joll, David J.; and Ziauddin, Habeeb M., 4,874,623, Cl. 426-272.000.
Ziegler, Horst; and Behlen, Horst, to W. C. Heraeus GmbH. Electronic thermometer. 4,874,252, Cl. 374-117.000.
Ziegler, James T., to Novation Design Ltd. Folding polygonal toy construction element. 4,874,341, Cl. 446-109.000.
Zielasek, Adelbert: *See*—
Grobecker, Hermann; Heher, Werner; Zielasek, Adelbert; and Nusselder, Frederik B., 4,874,085, Cl. 206-309.000.
Zimbone, Paul J., to Acushnet Company. Encapsulated spring assembly for reclining furniture. 4,874,154, Cl. 267-140.400.
Zylman, Bill E.: *See*—
Edelen, Stephen A.; Allen, David T.; and Zylman, Bill E., 4,873,881, Cl. 74-336.00R.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 17TH DAY OF OCTOBER, 1989

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Aluminum Company of America: *See*—
Sanders, Robert E., Jr.; and Petit, Jocelyn I., Re. 33,092, Cl. 148-12.70A.

Berguer, Ramon, to Lunax Corporation. Isothermic protective boot. Re. 33,090, Cl. 36-9.00R.

Gancy, Alan B. Magnesium calcium acetate products, and process for their manufacture. Re. 33,095, Cl. 252-70.000.

Helitune Limited: *See*—
Moir, Christopher I., Re. 33,097, Cl. 250-561.000.

Hitachi, Ltd.: *See*—
Maruyama, Eiichi; Ishioka, Sachio; Imamura, Yoshinori; Matsubara, Hirokazu; Shimomoto, Yasuharu; Horigome, Shinkichi; and Taniguchi, Yoshio, Re. 33,094, Cl. 430-57.000.

Horigome, Shinkichi: *See*—
Maruyama, Eiichi; Ishioka, Sachio; Imamura, Yoshinori; Matsubara, Hirokazu; Shimomoto, Yasuharu; Horigome, Shinkichi; and Taniguchi, Yoshio, Re. 33,094, Cl. 430-57.000.

Imamura, Yoshinori: *See*—
Maruyama, Eiichi; Ishioka, Sachio; Imamura, Yoshinori; Matsubara, Hirokazu; Shimomoto, Yasuharu; Horigome, Shinkichi; and Taniguchi, Yoshio, Re. 33,094, Cl. 430-57.000.

Ishioka, Sachio: *See*—
Maruyama, Eiichi; Ishioka, Sachio; Imamura, Yoshinori; Matsubara, Hirokazu; Shimomoto, Yasuharu; Horigome, Shinkichi; and Taniguchi, Yoshio, Re. 33,094, Cl. 430-57.000.

Iwamatsu, Seiichi, to Seiko Epson Corporation. Semiconductor substrate. Re. 33,096, Cl. 428-156.000.

Johnson & Johnson Consumer Products, Inc.: *See*—
Schiraldi, Michael T.; Perl, Martin M.; and Rubin, Howard, Re. 33,093, Cl. 424-676.000.

Lunax Corporation: *See*—
Berguer, Ramon, Re. 33,090, Cl. 36-9.00R.

Maruyama, Eiichi; Ishioka, Sachio; Imamura, Yoshinori; Matsubara, Hirokazu; Shimomoto, Yasuharu; Horigome, Shinkichi; and Taniguchi, Yoshio, to Hitachi, Ltd. Electrophotographic member with alpha-si layers. Re. 33,094, Cl. 430-57.000.

Matsubara, Hirokazu: *See*—
Maruyama, Eiichi; Ishioka, Sachio; Imamura, Yoshinori; Matsubara, Hirokazu; Shimomoto, Yasuharu; Horigome, Shinkichi; and Taniguchi, Yoshio, Re. 33,094, Cl. 430-57.000.

Moir, Christopher I., to Helitune Limited. Position detector. Re. 33,097, Cl. 250-561.000.

Perl, Martin M.: *See*—
Schiraldi, Michael T.; Perl, Martin M.; and Rubin, Howard, Re. 33,093, Cl. 424-676.000.

Petit, Jocelyn I.: *See*—
Sanders, Robert E., Jr.; and Petit, Jocelyn I., Re. 33,092, Cl. 148-12.70A.

Rubin, Howard: *See*—
Schiraldi, Michael T.; Perl, Martin M.; and Rubin, Howard, Re. 33,093, Cl. 424-676.000.

Sanders, Robert E., Jr.; and Petit, Jocelyn I., to Aluminum Company of America. High strength weldable aluminum base alloy product and method of making same. Re. 33,092, Cl. 148-12.70A.

Schiraldi, Michael T.; Perl, Martin M.; and Rubin, Howard, to Johnson & Johnson Consumer Products, Inc. Bioadhesive extruded film for intra-oral drug delivery and process. Re. 33,093, Cl. 424-676.000.

Schlosser, Erich J., to Weber-Stephen Products Co. Ash disposal damper for barbecue kettle. Re. 33,091, Cl. 126-9.00B.

Seiko Epson Corporation: *See*—
Iwamatsu, Seiichi, Re. 33,096, Cl. 428-156.000.

Shimomoto, Yasuharu: *See*—
Maruyama, Eiichi; Ishioka, Sachio; Imamura, Yoshinori; Matsubara, Hirokazu; Shimomoto, Yasuharu; Horigome, Shinkichi; and Taniguchi, Yoshio, Re. 33,094, Cl. 430-57.000.

Taniguchi, Yoshio: *See*—
Maruyama, Eiichi; Ishioka, Sachio; Imamura, Yoshinori; Matsubara, Hirokazu; Shimomoto, Yasuharu; Horigome, Shinkichi; and Taniguchi, Yoshio, Re. 33,094, Cl. 430-57.000.

Weber-Stephen Products Co.: *See*—
Schlosser, Erich J., Re. 33,091, Cl. 126-9.00B.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Bonner, William F.: *See*—
Brouns, Richard A.; Buelt, James L.; and Bonner, William F., B1 4,376,598, Cl. 405-258.000.

Brouns, Richard A.; Buelt, James L.; and Bonner, William F., to United States of America, Energy. In-situ vitrification of soil. B1 4,376,598, 10-17-89, Cl. 405-258.000.

Buelt, James L.: *See*—
Brouns, Richard A.; Buelt, James L.; and Bonner, William F., B1 4,376,598, Cl. 405-258.000.

Gruner, Heiko, to Plasmainvent AG. Vacuum plasma coating apparatus. B1 4,596,718, 10-17-89, Cl. 427-34.000.

Ichinomiya, Yoshiaki: *See*—
Takenouchi, Tomoo; Ichinomiya, Yoshiaki; and Iwanami, Yoshiyuki, B1 4,617,052, Cl. 420-129.000.

Iwanami, Yoshiyuki: *See*—
Takenouchi, Tomoo; Ichinomiya, Yoshiaki; and Iwanami, Yoshiyuki, B1 4,617,052, Cl. 420-129.000.

Plasmainvent AG: *See*—
Gruner, Heiko, B1 4,596,718, Cl. 427-34.000.

Scott Paper Co.: *See*—
Urion, Kenard E., B1 8,273,843, Cl. D9-339.000.

Takenouchi, Tomoo; Ichinomiya, Yoshiaki; and Iwanami, Yoshiyuki. Process for preparing a mother alloy for making amorphous metal. B1 4,617,052, 10-17-89, Cl. 420-129.000.

United States of America
Energy: *See*—
Brouns, Richard A.; Buelt, James L.; and Bonner, William F., B1 4,376,598, Cl. 405-258.000.

Urion, Kenard E., to Scott Paper Co. Container body. B1 8,273,843, 10-17-89, Cl. D9-339.000.

LIST OF DESIGN PATENTEES

Acoustics Development Corporation: *See*—
Nichols, John W.; and Van Pinkerton, Stevens, Jr., 304,002, Cl. D6-421.000.
Nichols, John W.; and Van Pinkerton, Stevens, Jr., 304,006, Cl. D6-553.000.
Albion Cosmetics Co., Ltd.: *See*—
Desgrippes, Joel, 304,098, Cl. D28-78.000.
American Home Products Corporation: *See*—
McAllister, Tom A.; McAllister, John S.; and Bonnar, William R., 304,105, Cl. D32-21.000.
American Telephone and Telegraph Company: *See*—
Fine, Irwin M.; and Harms, David A., 304,032, Cl. D14-113.000.
Ashton, Kim J.: *See*—
Lakhan, Haresh C.; Switala, Lawrence W.; and Ashton, Kim J., 304,102, Cl. D32-1.000.
AT&T Information Systems Inc.: *See*—
Fine, Irwin M.; and Harms, David A., 304,032, Cl. D14-113.000.
Atlanta Motoring Accessories, Inc.: *See*—
Snoke, Phillip J.; and Golley, Frank B., 304,118, Cl. D34-31.000.
Avia Group International, Inc.: *See*—
Feller, Craig L., 303,996, Cl. D2-320.000.
Azzolina, Albert. Armoire. 304,003, 10-17-89, Cl. D6-446.000.
Azzolina, Albert. Armoire. 304,004, 10-17-89, Cl. D6-446.000.
Badge-A-Minit, Ltd.: *See*—
Munson, Austin H.; and Bullis, Daniel R., Jr., 304,035, Cl. D15-122.000.
Bakic, Karena, to Cosmede Anstalt. Cosmetic case. 304,099, 10-17-89, Cl. D28-83.000.
Barrett, Ronnie G. Semi-automatic rifle. 304,062, 10-17-89, Cl. D22-103.000.
Bates, Kenneth R. Fishing lure. 304,066, 10-17-89, Cl. D22-129.000.
Baynes, John M.: *See*—
Meeker, Marlene F.; and Baynes, John M., 304,041, Cl. D21-20.000.
Bennett, Robert A., to R. J. S. Industries, Inc. Disposable cosmetic applicator and container thereof. 304,094, 10-17-89, Cl. D28-7.000.
Bettess, Peter D., to Micro-Shuttle Australia Pty. Ltd. Cart for use as stand or work station table. 304,112, 10-17-89, Cl. D34-21.000.
Bolvary, Kim T., to Bolvary, Kim Tibor. Canopy for a motor vehicle. 304,025, 10-17-89, Cl. D12-156.000.
Bolvary, Kim Tibor: *See*—
Bolvary, Kim T., 304,025, Cl. D12-156.000.
Bonnar, William R.: *See*—
McAllister, Tom A.; McAllister, John S.; and Bonnar, William R., 304,105, Cl. D32-21.000.
Bonori, Giampiero, to Joren Marketing Ltd. Razor or similar article. 304,097, 10-17-89, Cl. D28-46.000.
Brown, Ronald N. Belt attached umpire hand protector. 304,100, 10-17-89, Cl. D29-20.000.
Buchanan, Larry W.; and Gargarella, Ray A., to Buckhorn Material Handling Group, Inc. Lidded storage bin. 304,120, 10-17-89, Cl. D34-40.000.
Buckhorn Material Handling Group, Inc.: *See*—
Buchanan, Larry W.; and Gargarella, Ray A., 304,120, Cl. D34-40.000.
Bullis, Daniel R., Jr.: *See*—
Munson, Austin H.; and Bullis, Daniel R., Jr., 304,035, Cl. D15-122.000.
Bureau of Engraving, Inc.: *See*—
Thul, James L., 304,040, Cl. D20-22.000.
Busalt, Gerhard; and Stutzer, Franz A., to Rowenta-Werke GmbH. Cordless vacuum cleaner. 304,104, 10-17-89, Cl. D32-18.000.
Carlson, Robert B.; and Wucherpfenning, Fredrick D., to Toro Company, The. Shoulder and arm exercise machine. 304,058, 10-17-89, Cl. D21-195.000.
Carsello, John P., to Lamson & Sessions Co., The. Combined motion sensor and mounting for adjustable flood lights. 304,019, 10-17-89, Cl. D10-106.000.
Cernansky, Joseph S.: *See*—
Rudell, Elliot A.; and Cernansky, Joseph S., 304,044, Cl. D21-104.000.
Chuan, Tsai G. Barbeque grill. 304,010, 10-17-89, Cl. D7-332.000.
Cohn, Robert J., to InterMetro Industries Corporation. Top shelf for a modular cart. 304,115, 10-17-89, Cl. D34-27.000.
Cooper, Timothy H. Exercise rod. 304,057, 10-17-89, Cl. D21-191.000.
Corkins, Delbert J.: *See*—
Kelley, David A.; Corkins, Delbert J.; and Hileman, Robert S., 304,088, Cl. D26-24.000.
Cosmede Anstalt: *See*—
Bakic, Karena, 304,099, Cl. D28-83.000.
Cowan, Murray L., to Textron, Inc. Expansion bracelet. 304,020, 10-17-89, Cl. D11-25.000.
Cramer, Ronald G., to S. C. Johnson & Son, Inc. Bottle. 304,015, 10-17-89, Cl. D9-389.000.
Dameron, Rodger S. Nursing shawl. 303,995, 10-17-89, Cl. D2-225.000.
Dart Industries Inc.: *See*—
Freese, Lawrence O., 304,048, Cl. D21-109.000.
David, Mark A. Ice chest carrier. 304,114, 10-17-89, Cl. D34-24.000.
Davis, John R. Cup holder with slot for cup handle. 304,007, 10-17-89, Cl. D7-70.000.
Davis, Sydney V., to Ve-Alite Plastic Corporation. Carrying case. 303,998, 10-17-89, Cl. D3-73.000.
Decra-Stone, Inc.: *See*—
Gabayno, Liwayway J., 304,121, Cl. D34-42.000.
Desgrippes, Joel, to Albion Cosmetics Co., Ltd. Compact. 304,098, 10-17-89, Cl. D28-78.000.
Dickens, Jacqueline B. Finger puppet. 304,050, 10-17-89, Cl. D21-153.000.
Dickens, Jacqueline B. Finger puppet. 304,051, 10-17-89, Cl. D21-153.000.
Dickens, Jacqueline B. Finger puppet. 304,052, 10-17-89, Cl. D21-153.000.
Dickens, Jacqueline B. Finger puppet. 304,053, 10-17-89, Cl. D21-153.000.
Dideriksen, Erling T., to Interlego A.G. Toy rotor element. 304,047, 10-17-89, Cl. D21-108.000.
Dobson, Michael J.; Kelley, James P.; and Wilcutt, Michael E. Cleaning tool for ceiling fan blades. 304,106, 10-17-89, Cl. D32-40.000.
Down Under Orphans Pty. Limited: *See*—
Neville, Henry, 304,055, Cl. D21-159.000.
Eads, Stephen R. Fence runner. 304,086, 10-17-89, Cl. D8-1.000.
Eckstedt, Paul D.; and Whitmire, Thomas W., to FMC Corporation. Aircraft deicer vehicle. 304,024, 10-17-89, Cl. D12-14.000.
Ecolab Inc.: *See*—
Lakhan, Haresh C.; Switala, Lawrence W.; and Ashton, Kim J., 304,102, Cl. D32-1.000.
Elite S.R.I.: *See*—
Nithardt, Roland, 304,096, Cl. D28-12.000.
Fee Tat Plastic Factory Limited: *See*—
Wan, Yiu C. A., 304,089, Cl. D26-42.000.
Wan, Yiu C. A., 304,090, Cl. D26-42.000.
Feller, Craig L., to Avia Group International, Inc. Shoe sole. 303,996, 10-17-89, Cl. D2-320.000.
Film Applicators of North America: *See*—
Seraphin, Joseph A.; and Talbot, James E., 304,011, Cl. D8-29.100.
Fine, Irwin M.; and Harms, David A., to American Telephone and Telegraph Company; and AT&T Information Systems Inc. Computer display. 304,032, 10-17-89, Cl. D14-113.000.
FMC Corporation: *See*—
Eckstedt, Paul D.; and Whitmire, Thomas W., 304,024, Cl. D12-14.000.
Forbes, Hampton H., Jr., to Westvaco Corporation. Tub for packaging food or the like. 304,016, 10-17-89, Cl. D9-425.000.
Fratelli Guzzini S.p.A.: *See*—
Gecchelin, Bruno, 304,009, Cl. D7-103.000.
Freese, Lawrence O., to Dart Industries Inc. Toy ramp or the like. 304,048, 10-17-89, Cl. D21-109.000.
Fuller, Dennis E. Lock illuminator. 304,091, 10-17-89, Cl. D26-72.000.
Gabayno, Liwayway J., to Decra-Stone, Inc. Bowl. 304,121, 10-17-89, Cl. D34-42.000.
Gargarella, Ray A.: *See*—
Buchanan, Larry W.; and Gargarella, Ray A., 304,120, Cl. D34-40.000.
Gavin, Ellen, to L'Oreal S.A. Mascara applicator container. 304,095, 10-17-89, Cl. D28-7.000.
Gecchelin, Bruno, to Fratelli Guzzini S.p.A. Whisk for the preparation of cakes, pies and the like. 304,009, 10-17-89, Cl. D7-103.000.
Geisler, Udo M., to OSRAM Gesellschaft mit beschraenkter Haftung. Slide viewer. 304,037, 10-17-89, Cl. D16-229.000.
Glassman, Fredrick R. Light fixture. 304,092, 10-17-89, Cl. D26-85.000.
Golley, Frank B.: *See*—
Snoke, Phillip J.; and Golley, Frank B., 304,118, Cl. D34-31.000.
Goodner, Donna E.; and Naderi, Jamshid, to Hand Held Products, Inc. Battery pack for electronic bar code reader. 304,026, 10-17-89, Cl. D13-8.000.
Grosfillex, Raymond. Armchair. 304,001, 10-17-89, Cl. D6-379.000.
Grossiord, Claude, to S. T. Dupont. Key-ring. 303,997, 10-17-89, Cl. D3-61.000.
Hand Held Products, Inc.: *See*—
Goodner, Donna E.; and Naderi, Jamshid, 304,026, Cl. D13-8.000.
Hanifl, Paul H., to Sage Products, Inc. Disposal container for sharp articles or the like. 304,109, 10-17-89, Cl. D34-7.000.
Hanifl, Paul H.: *See*—
Lee & Smith; Hanifl, Paul H.; and Newton, John J., Jr., 304,080, Cl. D24-54.000.
Hans Grohe GmbH & Co. KG: *See*—
Haug, Andreas; and Schonherr, Thomas, 304,069, Cl. D23-243.000.
Haug, Andreas; and Schonherr, Thomas, 304,071, Cl. D23-250.000.
Hansson, Maria. Combined earring display and storage case. 303,999, 10-17-89, Cl. D3-75.000.
Harding, George W., to Poly-John Enterprises Corp. Outdoor toilet cabana. 304,082, 10-17-89, Cl. D25-16.000.
Harms, David A.: *See*—
Fine, Irwin M.; and Harms, David A., 304,032, Cl. D14-113.000.
Hasegawa, Saburo. Wire puzzle. 304,045, 10-17-89, Cl. D21-106.000.
Haug, Andreas; and Schonherr, Thomas, to Hans Grohe GmbH & Co. KG. Faucet handle. 304,069, 10-17-89, Cl. D23-243.000.
Haug, Andreas; and Schonherr, Thomas, to Hans Grohe GmbH & Co. KG. Faucet handle. 304,071, 10-17-89, Cl. D23-250.000.
Haynes, Robert E., to Lew Childre & Sons, Inc. Fishing reel. 304,065, 10-17-89, Cl. D22-141.000.
Henderson, Robert D.; and Poore, Robert L., Jr. Railroad warning sign. 304,039, 10-17-89, Cl. D20-10.000.

Herbst, Walter B., to Thomas Industries, Inc. Combined spray gun and closure cap. 304,068, 10-17-89, Cl. D23-226.000.

Hikoma Mfg. Co., Ltd.: *See*—
Kishi, Mitsuhiro, 304,117, Cl. D34-28.000.

Hileman, Robert S.: *See*—
Kelley, David A.; Corkins, Delbert J.; and Hileman, Robert S., 304,088, Cl. D26-24.000.

Hirose Electric Co., Ltd.: *See*—
Matsuzaki, Shuichi, 304,027, Cl. D13-24.000.
Matsuzaki, Shuichi, 304,028, Cl. D13-24.000.
Matsuzaki, Shuichi, 304,029, Cl. D13-24.000.

Hockney, Philip K., to Hockney Pty. Limited. Extrusion for use in the construction of a floor of a motor lorry. 304,085, 10-17-89, Cl. D25-119.000.

Hockney Pty. Limited: *See*—
Hockney, Philip K., 304,085, Cl. D25-119.000.

Holter, Alfred. Lamp. 304,093, 10-17-89, Cl. D26-94.000.

Hong, Moon H. Pyramid ball goal post. 304,059, 10-17-89, Cl. D21-200.000.

Hornung, John. Lunch box. 304,008, 10-17-89, Cl. D7-76.000.

Hughes, Richard E. Shut-off valve for specialty gases. 304,070, 10-17-89, Cl. D23-245.000.

Hunt, Devlin: *See*—
Raiter, Leon; Mor, John; and Hunt, Devlin, 304,061, Cl. D21-230.000.

Iacovelli, Marc R., to Rally Accessories, Inc. Roll top coin holder for an automobile dash. 304,124, 10-17-89, Cl. D99-34.000.

Ikeda, Hideyuki; and Saito, Shigeru, to Mitsubishi Denki Kabushiki Kaisha. Housing for a ceiling mounted air conditioner. 304,073, 10-17-89, Cl. D23-351.000.

Interlego A.G.: *See*—
Dideriksen, Erling T., 304,047, Cl. D21-108.000.
Knudsen, Jens N., 304,046, Cl. D21-108.000.
Poulsen, Ole V., 304,042, Cl. D21-91.000.
Tapdrup, Erik P., 304,043, Cl. D21-91.000.

InterMetro Industries Corporation: *See*—
Cohn, Robert J., 304,115, Cl. D34-27.000.
Welch, Robert J., 304,075, Cl. D24-1.100.

Itakura, Yoshitomo: *See*—
Nishiyama, Kenji; Takahashi, Hanji; and Itakura, Yoshitomo, 304,031, Cl. D14-121.000.

Janson, David. Desk set. 304,038, 10-17-89, Cl. D19-82.000.

Jenne , James F., to Wenger Corporation. Band shell. 304,083, 10-17-89, Cl. D25-58.000.

Jensen, Ronald P. Optical zone marker. 304,078, 10-17-89, Cl. D24-26.000.

John Manufacturing Limited: *See*—
Yuen, John S., 304,064, Cl. D22-120.000.

Joren Marketing Ltd.: *See*—
Bonori, Giampiero, 304,097, Cl. D28-46.000.

Jun, Seo Y. Ventilating cover for container. 304,116, 10-17-89, Cl. D34-28.000.

Kabushiki Kaisha Murakoshi Seiko: *See*—
Masuda, Yoshinori, 304,012, Cl. D8-323.000.

Kabushiki Kaisha Toshiba: *See*—
Nagaoka, Sinzi, 304,034, Cl. D14-231.000.

Kappler, Michael: *See*—
Porembski, Horst; and Kappler, Michael, 304,087, Cl. D26-3.000.

Kelley, David A.; Corkins, Delbert J.; and Hileman, Robert S., to Progressive Dynamics, Inc. Door operated convenience light for storage areas. 304,088, 10-17-89, Cl. D26-24.000.

Kelley, James P.: *See*—
Dobson, Michael J.; Kelley, James P.; and Wilcutt, Michael E., 304,106, Cl. D32-40.000.

Kishi, Mitsuhiro, to Hikoma Mfg. Co., Ltd. Elevating working platform. 304,117, 10-17-89, Cl. D34-28.000.

Knudsen, Jens N., to Interlego A.G. Externally curved toy wall element. 304,046, 10-17-89, Cl. D21-108.000.

Kohler Co.: *See*—
Reid, Mary J., 304,005, Cl. D6-497.000.

Lakhan, Haresh C.; Switala, Lawrence W.; and Ashton, Kim J., to Ecolab Inc. Solid detergent dispenser. 304,102, 10-17-89, Cl. D32-1.000.

Lambert Corporation: *See*—
Ruhl, Walter F.; Steed, Jeffrey A.; and Weaver, James M., 304,103, Cl. D32-15.000.

Lamson & Sessions Co., The: *See*—
Carsello, John P., 304,019, Cl. D10-106.000.

Lange, Mark R. Combined shirt pocket cuspidor and ashtray or similar article. 304,108, 10-17-89, Cl. D34-2.000.

Lee, Fu-Kuei. Toy water gun with extensible nozzle. 304,049, 10-17-89, Cl. D21-147.000.

Lee & Smith; Hanifl, Paul H.; and Newton, John J., Jr., to Sage Products, Inc. Urine collector attachment pad. 304,080, 10-17-89, Cl. D24-54.000.

Lew Childre & Sons, Inc.: *See*—
Haynes, Robert E., 304,065, Cl. D22-141.000.

Lights Of America, Inc.: *See*—
Vakil, Usman U., 304,030, Cl. D13-25.000.

L'Oreal S.A.: *See*—
Gavin, Ellen, 304,095, Cl. D28-7.000.

Lyall, Gordon M.; and McCarron, Philip F., to Simpson-Laurence Limited. Marine windlass. 304,119, 10-17-89, Cl. D34-33.000.

Mango, Joseph R., to World Dryer Division of Specialty Equipment Companies, Inc. Hand dryer. 304,101, 10-17-89, Cl. D28-54.100.

Masuda, Yoshinori, to Kabushiki Kaisha Murakoshi Seiko. Hinge. 304,012, 10-17-89, Cl. D8-323.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
Nishiyama, Kenji; Takahashi, Hanji; and Itakura, Yoshitomo, 304,031, Cl. D14-121.000.

Matsuzaki, Shuichi, to Hirose Electric Co., Ltd. Electrical connector plug. 304,027, 10-17-89, Cl. D13-24.000.

Matsuzaki, Shuichi, to Hirose Electric Co., Ltd. Electrical connector plug. 304,028, 10-17-89, Cl. D13-24.000.

Matsuzaki, Shuichi, to Hirose Electric Co., Ltd. Electrical connector plug. 304,029, 10-17-89, Cl. D13-24.000.

McAllister, John S.: *See*—
McAllister, Tom A.; McAllister, John S.; and Bonnar, William R., 304,105, Cl. D32-21.000.

McAllister, Tom A.; McAllister, John S.; and Bonnar, William R., to American Home Products Corporation. Spray-type, vacuum cleaner. 304,105, 10-17-89, Cl. D32-21.000.

McCarron, Philip F.: *See*—
Lyall, Gordon M.; and McCarron, Philip F., 304,119, Cl. D34-33.000.

McCue, Sam V. Wedge clamp housing for a downrigger fishing assembly. 304,013, 10-17-89, Cl. D8-396.000.

McFarlane, Richard H., to Taut, Inc. Flashback structure for a catheter having a transparent cover. 304,079, 10-17-89, Cl. D24-54.000.

Mead Corporation, The: *See*—
Oliff, James R., 304,017, Cl. D9-433.000.

Meeker, Marlene F.; and Baynes, John M. Game board. 304,041, 10-17-89, Cl. D21-20.000.

Mehalick, Joseph. Refuse container cart. 304,111, 10-17-89, Cl. D34-18.000.

Meng, Kenneth H. Ladder caddy. 304,084, 10-17-89, Cl. D25-68.000.

Micro-Shuttle Australia Pty. Ltd.: *See*—
Bettess, Peter D., 304,112, Cl. D34-21.000.

Minami, Hiroo, to Yoshida Kogyo K.K. Fastener. 304,023, 10-17-89, Cl. D11-221.000.

Minnesota Mining and Manufacturing Company: *See*—
Pospisil, Jirina V., 304,077, Cl. D24-16.000.

Mitsubishi Denki Kabushiki Kaisha: *See*—
Ikeda, Hideyuki; and Saito, Shigeru, 304,073, Cl. D23-351.000.

Miyamoto, Michikazu, to SMC Corporation. Fluidic power actuator. 304,036, 10-17-89, Cl. D15-199.000.

Mor, John: *See*—
Raiter, Leon; Mor, John; and Hunt, Devlin, 304,061, Cl. D21-230.000.

Moroney, John W., to Superior Fireplace Company. Suspended fireplace grate. 304,074, 10-17-89, Cl. D23-398.000.

Munson, Austin H.; and Bullis, Daniel R., Jr., to Badge-A-Minit, Ltd. Badge making machine. 304,035, 10-17-89, Cl. D15-122.000.

Naderi, Jamshid: *See*—
Goodner, Donna E.; and Naderi, Jamshid, 304,026, Cl. D13-8.000.

Nagaoka, Sinzi, to Kabushiki Kaisha Toshiba. Converter for a satellite receiving antenna. 304,034, 10-17-89, Cl. D14-231.000.

Neville, Henry, to Down Under Orphans Pty. Limited. Toy animal. 304,055, 10-17-89, Cl. D21-159.000.

New England AG Tech, Inc.: *See*—
White, Morton, 304,022, Cl. D11-155.000.

Newton, John J., Jr.: *See*—
Lee & Smith; Hanifl, Paul H.; and Newton, John J., Jr., 304,080, Cl. D24-54.000.

Nichols, John W.; and Van Pinkerton, Stevens, Jr., to Acoustics Development Corporation. Telephone enclosure. 304,002, 10-17-89, Cl. D6-421.000.

Nichols, John W.; and Van Pinkerton, Stevens, Jr., to Acoustics Development Corporation. Telephone enclosure. 304,006, 10-17-89, Cl. D6-553.000.

Nishiyama, Kenji; Takahashi, Hanji; and Itakura, Yoshitomo, to Matsushita Electric Industrial Co., Ltd. Cassette for a video tape recorder. 304,031, 10-17-89, Cl. D14-121.000.

Nithardt, Roland, to Elite S.R.I. Wall mounted hair dryer. 304,096, 10-17-89, Cl. D28-12.000.

Noggle, Donald R. Dustpan. 304,107, 10-17-89, Cl. D32-74.000.

Nomizu, Hidekatsu, to TWIN BIRD Industrial Company Limited. Alarm clock with voice recorder. 304,018, 10-17-89, Cl. D10-2.000.

Novi, Inc.: *See*—
Villanueva, Sergio E.; and Villanueva, Xavier R., 304,033, Cl. D14-224.000.

O'Connell, Mark E., to Thomas Industries Inc. Paint container. 304,014, 10-17-89, Cl. D9-372.000.

Oliff, James R., to Mead Corporation, The. Article carrier blank. 304,017, 10-17-89, Cl. D9-433.000.

OSRAM Gesellschaft mit beschraenkter Haftung: *See*—
Geissler, Udo M., 304,037, Cl. D16-229.000.

OSRAM GmbH: *See*—
Porembski, Horst; and Kappler, Michael, 304,087, Cl. D26-3.000.

Poly-John Enterprises Corp.: *See*—
Harding, George W., 304,082, Cl. D25-16.000.

Pontbriand, Norman W., Jr., to United Technologies Corporation. Tote box. 304,122, 10-17-89, Cl. D34-43.000.

Poore, Robert L., Jr.: *See*—
Henderson, Robert D.; and Poore, Robert L., Jr., 304,039, Cl. D20-10.000.

Porembski, Horst; and Kappler, Michael, to OSRAM GmbH. Compact fluorescent lamp. 304,087, 10-17-89, Cl. D26-3.000.

Pospisil, Jirina V., to Minnesota Mining and Manufacturing Company. Orthodontic bracket. 304,077, 10-17-89, Cl. D24-16.000.

Poulsen, Ole V., to Interlego A.G. Profile element (rear) for a toy aircraft wing. 304,042, 10-17-89, Cl. D21-91.000.

Primiano, Michael J. Water jet teeth cleaner. 304,076, 10-17-89, Cl. D24-15.000.

Progressive Dynamics, Inc.: *See—*
Kelley, David A.; Corkins, Delbert J.; and Hileman, Robert S., 304,088, Cl. D26-24.000.

R. J. S. Industries, Inc.: *See—*
Bennett, Robert A., 304,094, Cl. D28-7.000.

Raiter, Leon; Mor, John; and Hunt, Devlin, to Ski-free Marine, Inc. Water ski handle. 304,061, 10-17-89, Cl. D21-230.000.

Rally Accessories, Inc.: *See—*
Iacovelli, Marc R., 304,124, Cl. D99-34.000.

Reid, Mary J., to Kohler Co. Table leg. 304,005, 10-17-89, Cl. D6-497.000.

Rowenta-Werke GmbH: *See—*
Busalt, Gerhard; and Stutzer, Franz A., 304,104, Cl. D32-18.000.

Rudell, Elliot A.; and Cernansky, Joseph S., to Rudell, Elliot A. Turning pictures playbox. 304,044, 10-17-89, Cl. D21-104.000.

Ruhl, Walter F.; Steed, Jeffrey A.; and Weaver, James M., to Lambert Corporation. Vacuum-blower unit. 304,103, 10-17-89, Cl. D32-15.000.

S. C. Johnson & Son, Inc.: *See—*
Cramer, Ronald G., 304,015, Cl. D9-389.000.

S. T. Dupont: *See—*
Grossiord, Claude, 303,997, Cl. D3-61.000.

Sage Products, Inc.: *See—*
Hanifl, Paul H., 304,109, Cl. D34-7.000.
Lee & Smith; Hanifl, Paul H.; and Newton, John J., Jr., 304,080, Cl. D24-54.000.

Saito, Shigeru: *See—*
Ikeda, Hideyuki; and Saito, Shigeru, 304,073, Cl. D23-351.000.

Sanitation Equipment Limited: *See—*
Stewart, John M., 304,072, Cl. D23-295.000.

Schonherr, Thomas: *See—*
Haug, Andreas; and Schonherr, Thomas, 304,069, Cl. D23-243.000.
Haug, Andreas; and Schonherr, Thomas, 304,071, Cl. D23-250.000.

Seifert, Jane P. Toy kitten figure. 304,056, 10-17-89, Cl. D21-163.000.

Seraphin, Joseph A.; and Talbot, James E., to Film Applicators of North America. Heat gun. 304,011, 10-17-89, Cl. D8-29.100.

Shives, Jeny: *See—*
Shives, Robert; and Shives, Jeny, 304,021, Cl. D11-117.000.

Shives, Robert; and Shives, Jeny. Simulated flower with inflated blossom. 304,021, 10-17-89, Cl. D11-117.000.

Simpson-Laurence Limited: *See—*
Lyall, Gordon M.; and McCarron, Philip F., 304,119, Cl. D34-33.000.

Ski-free Marine, Inc.: *See—*
Raiter, Leon; Mor, John; and Hunt, Devlin, 304,061, Cl. D21-230.000.

SMC Corporation: *See—*
Miyamoto, Michikazu, 304,036, Cl. D15-199.000.

Smith, Malcolm P. Boat carrier. 304,113, 10-17-89, Cl. D34-24.000.

Smith, Paul L. Golf putter head. 304,060, 10-17-89, Cl. D21-217.000.

Snoke, Phillip J.; and Golley, Frank B., to Atlanta Motoring Accessories, Inc. Automobile hardtop storage rack. 304,118, 10-17-89, Cl. D34-31.000.

South African Polymer Holdings (Proprietary), Limited): *See—*
Warwick, Michael J., 304,123, Cl. D34-46.000.

Steed, Jeffrey A.: *See—*
Ruhl, Walter F.; Steed, Jeffrey A.; and Weaver, James M., 304,103, Cl. D32-15.000.

Stewart, John M., to Sanitation Equipment Limited. Toilet. 304,072, 10-17-89, Cl. D23-295.000.

Story, Carol A.: *See—*
Story, Oscar R.; and Story, Carol A., 304,063, Cl. D22-117.000.

Story, Oscar R.; and Story, Carol A. Self defense weapon or similar article. 304,063, 10-17-89, Cl. D22-117.000.

Stutzer, Franz A.: *See—*
Busalt, Gerhard; and Stutzer, Franz A., 304,104, Cl. D32-18.000.

Superior Fireplace Company: *See—*
Moroney, John W., 304,074, Cl. D23-398.000.

Switala, Lawrence W.: *See—*
Lakhan, Haresh C.; Switala, Lawrence W.; and Ashton, Kim J., 304,102, Cl. D32-1.000.

Takahashi, Hanji: *See—*
Nishiyama, Kenji; Takahashi, Hanji; and Itakura, Yoshitomo, 304,031, Cl. D14-121.000.

Talbot, James E.: *See—*
Seraphin, Joseph A.; and Talbot, James E., 304,011, Cl. D8-29.100.

Tapdrup, Erik P., to Interlego A.G. Wheel holder element for a toy aircraft. 304,043, 10-17-89, Cl. D21-91.000.

Taut, Inc.: *See—*
McFarlane, Richard H., 304,079, Cl. D24-54.000.

Textron, Inc.: *See—*
Cowan, Murray L., 304,020, Cl. D11-25.000.

Thomas Industries, Inc.: *See—*
Herbst, Walter B., 304,068, Cl. D23-226.000.
O'Connell, Mark E., 304,014, Cl. D9-372.000.

Thul, James L., to Bureau of Engraving, Inc. Dispenser/mount for informational sheets. 304,040, 10-17-89, Cl. D20-22.000.

Toro Company, The: *See—*
Carlson, Robert B.; and Wucherpfenning, Fredrick D., 304,058, Cl. D21-195.000.

Turbeville, Terry A. Display stand for literature. 304,000, 10-17-89, Cl. D6-310.000.

TWIN BIRD Industrial Company Limited: *See—*
Nomizu, Hidekatsu, 304,018, Cl. D10-2.000.

United Technologies Corporation: *See—*
Pontbriand, Norman W., Jr., 304,122, Cl. D34-43.000.

Vakil, Usman U., to Lights Of America, Inc. Fluorescent lamp adapter base. 304,030, 10-17-89, Cl. D13-25.000.

Van Meter, John B. House sculpture toy figure. 304,054, 10-17-89, Cl. D21-155.000.

Van Pinkerton, Stevens, Jr.: *See—*
Nichols, John W.; and Van Pinkerton, Stevens, Jr., 304,002, Cl. D6-421.000.
Nichols, John W.; and Van Pinkerton, Stevens, Jr., 304,006, Cl. D6-553.000.

Ve-Alite Plastic Corporation: *See—*
Davis, Sydney V., 303,998, Cl. D3-73.000.

Vero, Radu. Multi-storied building. 304,081, 10-17-89, Cl. D25-5.000.

Villanueva, Sergio E.; and Villanueva, Xavier R., to Novi, Inc. Combined radio support and speakers for bicycles and the like. 304,033, 10-17-89, Cl. D14-224.000.

Villanueva, Xavier R.: *See—*
Villanueva, Sergio E.; and Villanueva, Xavier R., 304,033, Cl. D14-224.000.

Wan, Yiu C. A., to Fee Tat Plastic Factory Limited. Multi-function lantern. 304,089, 10-17-89, Cl. D26-42.000.

Wan, Yiu C. A., to Fee Tat Plastic Factory Limited. Multi-function lantern. 304,090, 10-17-89, Cl. D26-42.000.

Ward, Gary P. Fishing hook and swivel holder. 304,067, 10-17-89, Cl. D22-149.000.

Warwick, Michael J., to South African Polymer Holdings (Proprietary), Limited). Crate. 304,123, 10-17-89, Cl. D34-46.000.

Weaver, James M.: *See—*
Ruhl, Walter F.; Steed, Jeffrey A.; and Weaver, James M., 304,103, Cl. D32-15.000.

Welch, Robert J., to InterMetro Industries Corporation. Emergency medical crash cart. 304,075, 10-17-89, Cl. D24-1.100.

Wenger Corporation: *See—*
Jenne , James F., 304,083, Cl. D25-58.000.

Westvaco Corporation: *See—*
Forbes, Hampton H., Jr., 304,016, Cl. D9-425.000.

White, Morton, to New England AG Tech, Inc. Pot for plants. 304,022, 10-17-89, Cl. D11-155.000.

Whitmire, Thomas W.: *See—*
Eckstedt, Paul D.; and Whitmire, Thomas W., 304,024, Cl. D12-14.000.

Wilcutt, Michael E.: *See—*
Dobson, Michael J.; Kelley, James P.; and Wilcutt, Michael E., 304,106, Cl. D32-40.000.

World Dryer Division of Specialty Equipment Companies, Inc.: *See—*
Mango, Joseph R., 304,101, Cl. D28-54.100.

Wucherpfenning, Fredrick D.: *See—*
Carlson, Robert B.; and Wucherpfenning, Fredrick D., 304,058, Cl. D21-195.000.

Yang, Fu H. Golf cart. 304,110, 10-17-89, Cl. D34-15.000.

Yoshida Kogyo K.K.: *See—*
Minami, Hiroo, 304,023, Cl. D11-221.000.

Yuen, John S., to John Manufacturing Limited. Insect repeller. 304,064, 10-17-89, Cl. D22-120.000.

LIST OF PLANT PATENTEES

Barberet-Maiolino, Nicole; and Blanc, Henri, to Establissements Barberat et Blanc, Laboratoire de Physiologie Vegetale. Spray carnation named Lonbankir. 7,047, 10-17-89, Cl. 71.000.

Barberet-Maiolino, Nicole; and Blanc, Henri, to Establissements: Barberet et Blanc Laboratoire de Physiologie Vegetale. Spray carnation named Londuci. 7,048, 10-17-89, Cl. 73.000.

Blanc, Henri: *See*—
Barberet-Maiolino, Nicole; and Blanc, Henri, 7,047, Cl. 71.000.
Barberet-Maiolino, Nicole; and Blanc, Henri, 7,048, Cl. 73.000.

Establissements Barberat et Blanc, Laboratoire de Physiologie Vegetale: *See*—
Barberet-Maiolino, Nicole; and Blanc, Henri, 7,047, Cl. 71.000.

Establissements: Barberet et Blanc Laboratoire de Physiologie Vegetale: *See*—
Barberet-Maiolino, Nicole; and Blanc, Henri, 7,048, Cl. 73.000.

CLASSIFICATION OF PATENTS

ISSUED OCTOBER 17, 1989

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

48 4,873,725
195 4,873,726

CLASS 4

226 4,873,727
233 4,873,728
4,873,729
252 R 4,873,730

CLASS 5

68 4,873,731
81 B 4,873,732
93 R 4,873,733
425 4,873,734
431 4,873,735
434 4,873,736
453 4,873,737

CLASS 8

149.1 4,874,390
442 4,874,391
662 4,874,392

CLASS D9

339 B1 8,273,843

CLASS 14

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CLASS 15

242 4,873,739
250 B 4,873,740

CLASS 16

105 4,873,741
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CLASS 17

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CLASS 24

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CLASS 29

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876 4,873,765

CLASS 30

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CLASS 34

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CLASS 36

9 R Re.33,090
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CLASS 37

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CLASS 42

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CLASS 47

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CLASS 48

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CLASS 49

386 4,873,791

CLASS 51

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227 R 4,873,794
293 4,874,398

CLASS 52

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CLASS 56

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340.1 4,873,820

CLASS 57

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CLASS 60

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CLASS 62

3.3 4,873,830
6 4,873,831
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CLASS 66

84 A 4,873,844
126 R 4,873,845

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178 4,873,847

CLASS 70

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CLASS 71

5 4,874,419
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93 4,874,420
95 4,874,422
4,874,423
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121 4,874,425

CLASS 72

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53 4,873,855
121 4,873,856
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336 4,873,859
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457 4,873,861

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517 R 4,873,868
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473 R 4,873,883
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579 R 4,873,889
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234 4,874,430

CLASS 76

108 A 4,873,895

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CLASS 91

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CLASS 92

158 4,873,913

CLASS 98

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258 R 4,873,923

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9 B Re.33,091

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12.7 A Re.33,092
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42 4,874,441

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47 4,874,037
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122 4,874,040
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166 4,874,042

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272 4,874,043
275 4,874,044

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249 4,874,059

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CLASS 187

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39 4,874,075

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CLASS 204

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4,874,477
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94 4,874,483
129.3 4,874,484
130 4,874,485
140 4,874,486
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157.44 4,874,489
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192.12 4,874,494
212 4,874,495
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298 4,874,497
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403 4,874,499
412 4,874,500
415 4,874,501

CLASS 206

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443 4,874,091
492 4,874,092
522 4,874,093
4,874,094
586 4,874,095
621 4,874,096

CLASS 208

45 4,874,502
67 4,874,503
111 4,874,504
131 4,874,505
413 4,874,506

CLASS 209

11 4,874,507
214 4,874,508
616 4,874,097

CLASS 210

169 4,874,509
172 4,874,510
198.2 4,874,511
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273 4,874,102

CLASS 219

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522 4,874,930

CLASS 220

1 T 4,874,103
4 B 4,874,104
4 C 4,874,105
4 F 4,874,106
20 4,874,107
93 4,874,108
94 R 4,874,109
241 4,874,110
404 4,874,111

CLASS 221

1 4,874,112

CLASS 222

143 4,874,113
168 4,874,114
386 4,874,115
399 4,874,116
487 4,874,117

CLASS 224

198 4,874,118
202 4,874,119
266 4,874,120

CLASS 226

74 4,874,121

CLASS 227

19 4,874,122
147 4,874,123

CLASS 228

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CLASS 229

132 4,874,125
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CLASS 235

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494 4,874,936

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49.5 4,874,127

CLASS 238

355 4,874,128

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36 4,874,129
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542 4,874,132
555 4,874,133

CLASS 241

19 4,874,134
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301 4,874,137

CLASS 242

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68.6 4,874,139
198 4,874,143
223 4,874,140
235 4,874,144

CLASS 244

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153 R 4,874,146

CLASS 248

97 4,874,141
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530 4,874,149

CLASS 249

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CLASS 250

203 R 4,874,937
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211 J 4,874,939
223 B 4,874,940
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309 4,874,946
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561 Re.33,097
578 4,874,957

CLASS 251

90 4,874,151

CLASS 252

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4,874,546
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4,874,549
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CLASS 254

264 4,874,152

CLASS 260

397.1 4,874,551
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403 4,874,553
404 4,874,554
412.4 4,874,555

CLASS 261

67 4,874,559
76 4,874,560

CLASS 264

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1.4 4,874,562
24.7 4,874,564
29.2 4,874,563
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63 4,874,153
154 4,874,570
175 4,874,571

CLASS 267

140.4 4,874,154

CLASS 269

6 4,874,155
158 4,874,156

CLASS 270

30 4,874,157
39 4,874,158

CLASS 271

171 4,874,159
227 4,874,160
265 4,874,161

CLASS 272

18 4,874,162
53.2 4,874,163

CLASS 273

1 E 4,874,164
1 GC 4,874,165
4,874,166
14 4,874,167
26 C 4,874,168
60 R 4,874,169
73 A 4,874,170
77 A 4,874,171
143 R 4,874,172
4,874,173
146 4,874,175
157 R 4,874,176
246 4,874,177
274 4,874,178
338 4,874,179
416 4,874,180

CLASS 279

1 A 4,874,181

CLASS 280

30 4,874,182
91 4,874,183
423.1 4,874,184
690 4,874,185

CLASS 281

28 4,874,186

CLASS 283

70 4,874,187
89 4,874,188

CLASS 285

39 4,874,189
82 4,874,174
158 4,874,190
332.3 4,874,191
337 4,874,192
369 4,874,193

CLASS 290

1 B 4,874,959

CLASS 294

88 4,874,194

CLASS 296

97.4 4,874,195
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162 4,874,197
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4,874,199
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222 4,874,202

CLASS 297

250 4,874,203
362 4,874,204
379 4,874,205

CLASS 301

37 R 4,874,206

CLASS 303

52 4,874,207
116 4,874,208

CLASS 307

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CLASS 310

57 4,874,972
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268 4,874,976
269 4,874,977
328 4,874,978
4,874,979
4,874,980

CLASS 312

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330.1 4,874,212

CLASS 313

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CLASS 315

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CLASS 318

254 4,874,993
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567 4,874,996
568.1 4,874,997
568.21 4,874,998
610 4,874,999
798 4,875,000

CLASS 323

223 4,875,001

CLASS 324

73 R 4,875,002
4,875,003
158 D 4,875,004
158 F 4,875,005
158 R 4,875,006
207 4,875,007
208 4,875,008
4,875,009
248 4,875,010
251 4,875,011
309 4,875,012
318 4,875,013
323 4,875,015
326 4,875,014

CLASS 328

26 4,875,016

CLASS 329

336 4,875,017

CLASS 330

288 4,875,018
302 4,875,019
307 4,875,020

CLASS 331

78 4,875,021

CLASS 333

20 4,875,022
81 R 4,875,023
127 4,875,024
230 4,875,025
251 4,875,026
254 4,875,027

CLASS 340

473 4,875,028
567 4,875,029
575 4,875,030
605 4,875,031
703 4,875,032
706 4,875,033
721 4,875,034
731 4,875,035
784 4,875,036
825.01 4,875,037
825.060 4,875,040
825.44 4,875,038
825.440 4,875,039
870.13 4,875,041
870.170 4,875,042

CLASS 341

22 4,875,043
87 4,875,044
139 4,875,045
148 4,875,046
155 4,875,047
156 4,875,048
159 4,875,049

CLASS 342

195 4,875,050

CLASS 343

715 4,875,051
882 4,875,052
903 4,875,053

CLASS 346

1.1 4,875,054
75 4,875,055
76 PH 4,875,056
107 R 4,875,057
140 R 4,875,058
4,875,059
155 4,875,060
4,875,153
157 4,875,061
159 4,875,062
160.1 4,875,063

CLASS 350

3.67 4,874,213
3.7 4,874,214
6.6 4,874,215
96.19 4,874,216
96.20 4,874,217
4,874,218
96.23 4,874,219
96.26 4,874,220
96.29 4,874,221
96.34 4,874,222
163 4,874,223
174 4,874,224
259 4,874,225
319 4,874,226
334 4,874,227
345 4,874,228
357 4,874,229
423 4,874,230
427 4,874,231
4,874,232
429 4,874,233

CLASS 351

161 4,874,234
201 4,874,235
205 4,874,236
221 4,874,237

CLASS 353

78 4,875,064

CLASS 354

82 4,875,065
296 4,875,066
325 4,875,067

CLASS 355

20 4,875,071
23 4,875,072
27 4,875,073
4,875,074
50 4,875,075
53 4,875,076
212 4,875,077
246 4,875,078
4,875,079
4,875,080
271 4,875,069
286 4,875,068
299 4,875,070
303 4,875,081
309 4,874,958

CLASS 356

1 4,874,238
4 4,874,239
73 4,874,240
238 4,874,241

341 4,874,242
342 4,874,243
350 4,874,244
364 4,874,245
375 4,874,246
402 4,874,247

CLASS 357

15 4,875,082
23.6 4,875,083
30 4,875,084
34 4,875,085
54 4,875,086
67 4,875,088
71 4,875,087

CLASS 358

10 4,875,089
12 4,875,090
42 4,875,091
75 4,875,092
83 4,875,093
105 4,875,094
133 4,875,095
143 4,875,096
180 4,875,097
213.11 4,875,099
213.16 4,875,098
213.19 4,875,100
4,875,101
214 4,875,102
4,875,103
310 4,875,105
314 4,875,106
400 4,875,104

CLASS 360

9.1 4,875,107
51 4,875,108
60 4,875,109
64 4,875,110
4,875,111
65 4,875,112
74.2 4,875,113
77.08 4,875,114
77.15 4,875,115
78.11 4,875,116
98.01 4,875,117
99.12 4,875,118
105 4,875,119
106 4,875,120
109 4,875,122
4,875,123
122 4,875,129
126 4,875,124
128 4,875,125
129 4,875,121
130.21 4,875,127
130.23 4,875,126
133 4,875,128

CLASS 361

56 4,875,130
103 4,875,131
117 4,875,132
230 4,875,133
282 4,875,134
283 4,875,135
321 4,875,136
331 4,875,137
410 4,875,139
412 4,875,140

CLASS 362

61 4,875,141
72 4,875,142
86 4,875,143
103 4,875,144
4,875,145
202 4,875,146
205 4,875,147

CLASS 363

41 4,875,148
4,875,149
51 4,875,150
127 4,875,151
146 4,875,152

CLASS 364

200 4,875,155
4,875,156
4,875,157
4,875,158
4,875,159
4,875,160
4,875,161
206 4,875,154
401 4,875,162
405 4,875,163
412 4,875,164
413.22 4,875,165
421 4,875,166
424.04 4,875,167
431.01 4,875,168
497 4,875,169
507 4,875,170
508 4,875,171
513 4,875,172
518 4,875,173
519 4,875,174
551.01 4,875,175
557 4,875,176
559 4,875,177
578 4,875,178
708 4,875,179
715.03 4,875,180
716 4,875,181
732 4,875,182
807 4,875,183
4,875,184
900 4,875,185
4,875,186
4,875,187

CLASS 365

185 4,875,188
189.01 4,875,191
189.04 4,875,189
4,875,190
193 4,875,192
207 4,875,193
210 4,875,194
230.08 4,875,195
238 4,875,196

CLASS 366

307 4,874,248
339 4,874,249

CLASS 367

32 4,875,197
93 4,875,198
175 4,875,199

CLASS 368

67 4,875,200
120 4,875,201

CLASS 369

32 4,875,202
46 4,875,203
100 4,875,204

CLASS 370

6 4,875,205
85.12 4,875,207
85.15 4,875,206
94.1 4,875,208

CLASS 371

3 4,875,209
27 4,875,210
40.1 4,875,211
40.2 4,875,212

CLASS 372

5 4,875,213
4,875,214
6 4,875,215
45 4,875,216
50 4,875,217
64 4,875,218
92 4,875,219
107 4,875,220

CLASS 374

43 4,874,250
45 4,874,251
117 4,874,252
121 4,874,253
208 4,874,254

CLASS 375

1 4,875,221
26 4,875,222
36 4,875,223
118 4,875,224

CLASS 376

256 4,874,572
272 4,874,573
333 4,874,574
404 4,874,575

CLASS 378

99 4,875,225
146 4,875,226
154 4,875,227
197 4,875,228

CLASS 379

58 4,875,229
61 4,875,231
63 4,875,230
413 4,875,232
430 4,875,233
434 4,875,234

CLASS 383

8 4,874,255
21 4,874,256
63 4,874,257
111 4,874,258

CLASS 384

445 4,874,259
470 4,874,260
484 4,874,261

CLASS 400

216.1 4,874,262
241.3 4,874,263
335 4,874,264
357 4,874,265

CLASS 403

407.1 4,874,266

CLASS 405

142 4,874,267
184 4,874,268
209 4,874,269
248 4,874,270
258 B1 4,376,598
283 4,874,271
284 4,874,272

CLASS 406

88 4,874,273

CLASS 409

300 4,874,274

CLASS 411

5 4,874,275
48 4,874,276
61 4,874,277
386 4,874,278
420 4,874,300

CLASS 412

39 4,874,279

CLASS 414

234 4,874,280
285 4,874,281
416 4,874,282
504 4,874,283
537 4,874,284
563 4,874,285
744.5 4,874,286

CLASS 415

149.2 4,874,287
150 4,874,288
4,874,289
173.4 4,874,290

CLASS 416

122 4,874,291
140 4,874,292
184 4,874,293

CLASS 417

12 4,874,294
222 4,874,295
234 4,874,296
265 4,874,297
315 4,874,298
413 4,874,299
462 4,874,301

CLASS 418

55 4,874,302

CLASS 420

22 4,874,576
129 B1 4,617,052
417 4,874,577
541 4,874,578

CLASS 422

16 4,874,579
25 4,874,580
46 4,874,581
102 4,874,582
143 4,874,583
145 4,874,584
171 4,874,585
177 4,874,586
189 4,874,587
269 4,874,588

CLASS 423

220 4,874,589
239 4,874,590
240 4,874,591
262 4,874,592
322 4,874,593
335 4,874,594
397 4,874,595
446 4,874,596
490 4,874,599
598 4,874,598

CLASS 424

1.1 4,874,600
4,874,601
10 4,874,602
4,874,603
47 4,874,604
78 4,874,605
84 4,874,607
85.1 4,874,608
85.4 4,874,609
196.1 4,874,610
410 4,874,611
425 4,874,612
458 4,874,613
465 4,874,614
676 Re.33,093

CLASS 425

28.1 4,874,303
84 4,874,304
131.1 4,874,305
192 R 4,874,306
311 4,874,307
544 4,874,308
589 4,874,309

CLASS 426

15 4,874,615
43 4,874,616
49 4,874,617
74 4,874,606
76 4,874,618
94 4,874,619
113 4,874,620
124 4,874,621
135 4,874,622
272 4,874,623
457 4,874,624
533 4,874,625
564 4,874,626
565 4,874,627
578 4,874,628
601 4,874,629
634 4,874,630

CLASS 427

34 B1 4,596,718
39 4,874,631
41 4,874,632
48 4,874,633
54.1 4,874,634
96 4,874,635
130 4,874,636
131 4,874,637
222 4,874,638
240 4,874,639
244 4,874,641
249 4,874,642
340 4,874,643
421 4,874,640

CLASS 428

31 4,874,645
34.1 4,874,646
35.7 4,874,647
35.9 4,874,648
36.5 4,874,649
68 4,874,650
81 4,874,651
137 4,874,652
156 Re.33,096
182 4,874,653
192 4,874,654
198 4,874,655
216 4,874,656
220 4,874,657
4,874,658
221 4,874,659
234 4,874,660
246 4,874,661
266 4,874,662
272 4,874,663
325 4,874,664
345 4,874,665
398 4,874,666
402.22 4,874,667
403 4,874,668
416 4,874,669
423.9 4,874,670
447 4,874,671
457 4,874,672
463 4,874,673
469 4,874,674
521 4,874,675
542.2 4,874,676
605 4,874,677

CLASS 429

30 4,874,678
91 4,874,679
197 4,874,680
210 4,874,681

CLASS 430

57 Re.33,094
59 4,874,682
114 4,874,683
138 4,874,684
4,874,685
272 4,874,686
446 4,874,687
546 4,874,688
548 4,874,689

CLASS 431

8 4,874,310

CLASS 432

13 4,874,311
122 4,874,312
247 4,874,313

CLASS 433

129 4,874,314
215 4,874,315

CLASS 435

2 4,874,690
7 4,874,691
4,874,692
4,874,693
15 4,874,694
19 4,874,695
26 4,874,696
68 4,874,697
108 4,874,698
135 4,874,699
145 4,874,700
147 4,874,701
172 4,874,702
252.33 4,874,703
4,874,705
252.9 4,874,704
253.3 4,874,706
253.6 4,874,707
272 4,874,708

CLASS 436

42 4,874,709
518 4,874,710

CLASS 437

8 4,874,711
31 4,874,712
34 4,874,713
39 4,874,714
43 4,874,715
4,874,716
59 4,874,717
62 4,874,718
195 4,874,719
203 4,874,720
209 4,874,721
4,874,722
245 4,874,723

CLASS 439

39 4,874,316
54 4,874,317
71 4,874,318
108 4,874,319
115 4,874,320
119 4,874,321
210 4,874,322
260 4,874,323
271 4,874,324
272 4,874,325
273 4,874,326
275 4,874,327
278 4,874,328
409 4,874,329
418 4,874,330
449 4,874,331
462 4,874,332
514 4,874,333
538 4,874,334
589 4,874,335
607 4,874,336
609 4,874,337
851 4,874,338

CLASS 441

36 4,873,933

CLASS 445

28 4,874,339

CLASS 446

4,874,340
109 4,874,341
168 4,874,342
175 4,874,343
268 4,874,344
394 4,874,345
484 4,874,346

CLASS 453

5 4,874,347
50 4,874,348

CLASS 464

14 4,874,349
68 4,874,350

CLASS 474

49 4,874,351
110 4,874,352
168 4,874,353

CLASS 493

101 4,874,354
148 4,874,355
335 4,874,356

CLASS 494

26 4,874,357
37 4,874,358

CLASS 501

10 4,874,724
89 4,874,725
124 4,874,726
134 4,874,727
148 4,874,728

CLASS 502

61 4,874,729
4,874,730
66 4,874,731
74 4,874,732
4,874,733
104 4,874,734
159 4,874,735
165 4,874,736
171 4,874,737
209 4,874,738
218 4,874,739

CLASS 503

201 4,874,740

CLASS 505

1 4,874,741

CLASS 514

2 4,874,742
12 4,874,743
13 4,874,744
18 4,874,745
21 4,874,746
23 4,874,747
29 4,874,748
30 4,874,749
42 4,874,750
50 4,874,751
89 4,874,753
178 4,874,754
179 4,874,755
212 4,874,756
226.5 4,874,757
4,874,758
232.5 4,874,759
234.2 4,874,760
235.2 4,874,761
242 4,874,762
249 4,874,763
254 4,874,764
255 4,874,765
258 4,874,766
278 4,874,767
288 4,874,768
314 4,874,769
326 4,874,770
331 4,874,771
341 4,874,772
355 4,874,773
356 4,874,774
357 4,874,775
365 4,874,776
381 4,874,777
403 4,874,778
410 4,874,779
452 4,874,780
463 4,874,781
473 4,874,782
517 4,874,784
526 4,874,785
528 4,874,786
531.125 4,874,787
534 4,874,788
551 4,874,789
557 4,874,790
558 4,874,791
570 4,874,792
656 4,874,793
724 4,874,794
725 4,874,795

CLASS 521

59 4,874,796
167 4,874,797

CLASS 522

31 4,874,798
96 4,874,799

CLASS 523

205 4,874,800
214 4,874,801

CLASS 524

94 4,874,802
4,874,803
100 4,874,804
188 4,874,805
204 4,874,806
267 4,874,807
291 4,874,808
449 4,874,809

CLASSIFICATION OF PATENTS

482	4,874,783
505	4,874,810
516	4,874,811
712	4,874,812
CLASS 525	
54.1	4,874,813
61	4,874,814
71	4,874,815
146	4,874,816
183	4,874,817
	4,874,818
185	4,874,819
240	4,874,820
271	4,874,821
279	4,874,822
329.2	4,874,823
379	4,874,824
425	4,874,825
534	4,874,826
CLASS 526	
214	4,874,827
262	4,874,828
	4,874,829
318.4	4,874,830
CLASS 528	
48	4,874,831
60	4,874,832
90	4,874,833
176	4,874,834
179	4,874,835
185	4,874,836
291	4,874,837
408	4,874,838
480	4,874,839
	4,874,840
491	4,874,841
494	4,874,842
CLASS 530	
317	4,874,843
331	4,874,844
395	4,874,845
CLASS 534	
560	4,874,846
565	4,874,847
684	4,874,848
696	4,874,849
CLASS 536	
3	4,874,850
17.2	4,874,851
18.6	4,874,852
27	4,874,853
55.2	4,874,752
114	4,874,854
CLASS 540	
3	4,874,855
99	4,874,863
222	4,874,856
CLASS 544	
75	4,874,857
196	4,874,858
221	4,874,859
	4,874,860
229	4,874,861
276	4,874,862
CLASS 546	
153	4,874,864
243	4,874,865
CLASS 548	
100	4,874,866
101	4,874,867
110	4,874,868
309	4,874,869
336	4,874,870
531	4,874,872
540	4,874,873
543	4,874,871
544	4,874,874
959	4,874,875
CLASS 549	
49	4,874,876
66	4,874,877
462	4,874,878
536	4,874,879
CLASS 556	
53	4,874,880
453	4,874,881
CLASS 558	
131	4,874,882
150	4,874,883
338	4,874,884
CLASS 560	
15	4,874,885
70	4,874,886
124	4,874,887
204	4,874,888
205	4,874,889
	4,874,890
256	4,874,891
CLASS 562	
2	4,874,556
409	4,874,892
443	4,874,893
851	4,874,557
894	4,874,558
CLASS 564	
93	4,874,894
437	4,874,895
479	4,874,896
CLASS 568	
13	4,874,897
369	4,874,898
386	4,874,899
390	4,874,900
683	4,874,901
	4,874,902
CLASS 604	
4	4,874,359
8	4,874,360
20	4,874,361
26	4,874,362
28	4,874,363
35	4,874,364
54	4,874,365
56	4,874,366
72	4,874,367
82	4,874,368
86	4,874,369
93	4,874,370
95	4,874,371
110	4,874,372
164	4,874,373
	4,874,374
	4,874,375
165	4,874,376
167	4,874,377
	4,874,378
168	4,874,379
180	4,874,380
191	4,874,381
195	4,874,382
198	4,874,383
	4,874,384
208	4,874,385
246	4,874,386
326	4,874,387
891.1	4,874,388
CLASS 623	
17	4,874,389

CLASSIFICATION OF DESIGNS

D2—	225	303,995
	320	303,996
D3—	61	303,997
	73	303,998
	75	303,999
D6—	310	304,000
	379	304,001
	421	304,002
	446	304,003
		304,004
	497	304,005
	553	304,006
D7—	70	304,007
	76	304,008
	103	304,009
	332	304,010
D8—	1	304,086
	29.1	304,011
	323	304,012
	396	304,013
D9—	372	304,014
	389	304,015
	425	304,016
	433	304,017
D10—	2	304,018
	106	304,019
D11—	25	304,020
	117	304,021
	155	304,022
	221	304,023
D12—	14	304,024
	156	304,025
D13—	8	304,026
	24	304,027
		304,028
		304,029
	25	304,030
D14—	113	304,032
	121	304,031
	224	304,033
	231	304,034
D15—	122	304,035
	199	304,036
D16—	229	304,037
D19—	82	304,038
D20—	10	304,039
	22	304,040
D21—	20	304,041
	91	304,042
		304,043
	104	304,044
	106	304,045
	108	304,046
		304,047
	109	304,048
	147	304,049
	153	304,050
		304,051
		304,052
	155	304,054
	159	304,055
	163	304,056
	191	304,057
	195	304,058
	200	304,059
	217	304,060
	230	304,061
D22—	103	304,062
	117	304,063
	120	304,064
	129	304,066
	141	304,065
	149	304,067
D23—	226	304,068
	243	304,069
	245	304,070
	250	304,071
	295	304,072
	351	304,073
	398	304,074
D24—	1.1	304,075
	15	304,076
	16	304,077
	26	304,078
	54	304,079
		304,080
D25—	5	304,081
	16	304,082
	58	304,083
	68	304,084
	119	304,085
D26—	3	304,087
	24	304,088
	42	304,089
		304,090
	72	304,091
	85	304,092
	94	304,093
D28—	7	304,094
		304,095
	12	304,096
	46	304,097
	54.1	304,101
	78	304,098
	83	304,099
D29—	20	304,100
D32—	1	304,102
	15	304,103
	18	304,104
	21	304,105
	40	304,106
	74	304,107
D34—	2	304,108
	7	304,109
	15	304,110
	18	304,111
	21	304,112
	24	304,113
		304,114
	27	304,115
	28	304,116
		304,117
	31	304,118
	33	304,119
	40	304,120
	42	304,121
	43	304,122
	46	304,123
D99—	34	304,124

CLASSIFICATION OF PLANTS

P.—	71	7,047
	73	7,048

GEOGRAPHICAL INDEX

OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

01 : 4,874,106
4,874,110
4,874,192
4,874,532
04 : 4,873,871
4,873,906
4,873,942
4,873,976
4,874,013
4,874,016
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4,874,012
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4,874,024
4,874,152
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4,874,365
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4,874,367
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4,874,706
4,874,943
4,874,959
4,874,960
4,874,996
4,875,009
4,875,019
4,875,149

DESIGN PATENTS

01 : 304,065
304,086
304,106
06 : 304,008
304,024
304,030
304,033
304,044
304,057
304,059
304,070
304,074
304,077
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304,083
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304,102
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